PROJECT MANUAL
ISSUED FOR BIDS: October 17, 2024

2024 RENOVATIONS – BID PACKAGE 2

for

McHenry County College

8900 U.S. Hwy 14
Crystal Lake, IL 60012

DEMONICA KEMPER ARCHITECTS

125 N. Halsted Street, Suite 301
Chicago, Illinois 60661
P 312.496.0000
F 312.496.0001

DKA Project Number: 24-013
MCC Bid Number: IFB#11122024

DIVISION 0 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 11 13..... Advertisement for Bids 1
00 21 13..... Instructions to Bidders..... 4
00 41 13..... Bid Form 4
00 43 13..... Bid Bond 1
00 43 15..... Contractor Certification 1
00 43 25..... Substitution Sheet..... 1
00 43 29..... W9..... 1
00 43 39..... Business Enterprise Program Participation & Utilization Plan 7
00 43 43..... Certificate of Compliance with the Illinois Prevailing Wage Law 1
00 72 13..... General Conditions of the Contract for Construction..... 69
00 73 63..... Prevailing Wage Requirements..... 10

DIVISION 1 - GENERAL REQUIREMENTS

01 10 00..... Project Summary..... 4
01 21 00..... Allowances..... 4
01 23 00..... Alternates..... 2
01 25 00..... Substitution Procedures 3
01 26 00..... Contract Modification Procedures..... 3
01 29 00..... Payment Procedures..... 5
01 31 00..... Project Management and Coordination..... 10
01 32 00..... Construction Progress Documentation..... 9
01 33 00..... Submittal Procedures..... 10
01 40 00..... Quality Requirements..... 8
01 42 00..... References..... 16
01 50 00..... Temporary Facilities and Controls..... 10
01 60 00..... Product Requirements 5
01 73 00..... Execution 9
01 77 00..... Closeout Procedures..... 6
01 78 23..... Operation and Maintenance Data 7
01 78 39..... Project Record Documents 5

DIVISION 2 - EXISTING CONDITIONS

02 41 19..... Selective Demolition..... 7

DIVISION 6 – WOOD, PLASTICS, AND COMPOSITES

06 10 00..... Rough Carpentry..... 7
06 41 16..... Plastic-Laminate-Clad Architectural Cabinets 7
06 42 16..... Flush Wood Paneling 7

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

07 81 00..... Applied Fire Protection..... 7
07 84 43..... Joint Firestopping..... 6
07 92 00..... Joint Sealants..... 10

DIVISION 8 – OPENINGS

08 11 13..... Hollow Metal Doors and Frames..... 8
08 14 16..... Flush Wood Doors 8
08 35 13..... Folding Doors..... 5
08 41 13..... Aluminum-Framed Entrances and Storefronts 8
08 41 26..... All-Glass Entrances and Storefronts 6
08 71 00..... Door Hardware..... 24
08 80 00..... Glazing..... 9

DIVISION 9 – FINISHES
09 22 16..... Non-Structural Metal Framing 6
09 29 00..... Gypsum Board 8
09 30 13..... Ceramic Tiling 8
09 51 13..... Acoustical Panel Ceilings 6
09 65 13..... Resilient Base and Accessories 4
09 65 19..... Resilient Tile Flooring 5
09 68 13..... Tile Carpeting 5
09 72 00..... Wall Coverings 4
09 84 33..... Sound Absorbing Wall and Ceiling Units 6
09 91 23..... Interior Painting 6

DIVISION 10 – SPECIALTIES
10 11 00..... Visual Display Units 5
10 14 19..... Dimensional Letter Signage 6
10 14 23..... Panel Signage 3
10 26 00..... Wall and Door Protection 4
10 28 00..... Toilet, Bath, and Laundry Accessories 3
10 44 13..... Fire Protection Cabinets 5
10 44 16..... Fire Extinguishers 3

DIVISION 12 - FURNISHINGS
12 24 13..... Roller Window Shades 5
12 36 23.13.. Plastic-Laminate-Clad Countertops 5
12 36 61.16.. Solid Surfacing Countertops 4

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)
23 05 03..... HVAC Piping 13
23 05 23..... General Duty Valves for HVAC Piping 5
23 05 29..... Hangers and Supports for HVAC Piping and Equipment 14
23 05 53..... Identification for HVAC Piping, Ductwork, and Equipment 4
23 05 93..... Testing, Adjusting, and Balancing for HVAC 10
23 07 00..... HVAC Insulation 14
23 09 00..... Instrumentation and Control for HVAC 15
23 09 23..... Direct Digital Controls for HVAC 17
23 09 93..... Sequence of Operations 4
23 21 16..... Hydronic Piping Specialties 10
23 23 00..... Refrigerant Piping and Specialties 11
23 25 00..... HVAC Water Treatment 6
23 31 00..... Ductwork 7
23 33 00..... Air Duct Accessories 6
23 36 00..... Air Terminal Units 6
23 37 00..... Air Outlets and Inlets 5
23 81 23..... Pre-Purchased Computer-Room Air-Conditioners 7

DIVISION 26 – ELECTRICAL
26 05 00..... Common Work Results for Electrical 8
26 05 05..... Selective Demolition for Electrical 4
26 05 19..... Low-Voltage Electrical Power Conductors and Cables 4
26 05 26..... Grounding and Bonding for Electrical Systems 5
26 05 29..... Hanger and Supports for Electrical Systems 4
26 05 33..... Raceway and Boxes 12
26 05 53..... Identification for Electrical Systems 4
26 09 23..... Lighting Control Devices 11
26 24 16..... Panelboards 7

26 27 26 ..... Wiring Devices 5
26 51 00 ..... Interior Lighting 5

DIVISION 27 – COMMUNICATIONS
27 15 00 ..... Data Communication Network Cabling 12
27 51 23 ..... Integrated Communications System 5

SECTION 00 11 13 – ADVERTISEMENT FOR BIDS

1.1 BID INFORMATION

A. Sealed Bids will be received by McHenry County College, on or before November 12, 2024, at 9:30 a.m., prevailing time for the 2024 Renovations – Bid Package 2 for McHenry County College.

B. Lump sum bid proposals will be received for this project at the scheduled time of receipt of bids and will be publicly opened there after, at 10:00 a.m. in Board Room A217.

C. Bid security in the form of a bid bond, certified check, or cash in an amount equal to ten percent (10%) of the base bid amount shall be submitted with the bid. Should a bid bond be submitted, the bid bond shall be payable to the Board of Trustees, McHenry County College.

D. Bids shall be submitted on or before the specified closing time in an opaque sealed envelope addressed to: Ms. Maricella Garza, Coordinator of Purchasing, Building A, Room A246, 8900 US Hwy 14, Crystal Lake, Illinois 60012

E. A MANDATORY Pre-Bid Meeting will be held on October 29, 2024, at 10:00 a.m., in Board Room A217, McHenry County College, 8900 US Hwy 14, Crystal Lake, IL 60012. Representatives from the College and the Architect's office will be present to answer questions regarding bidding procedures and project requirements.

F. The College reserves the right to reject any or all bids or parts thereof, or waive any irregularities or informalities, and to make the award in the best interest of the College. Decisions of the College will be final.

G. Minority-Owned, Female-Owned, and Persons with Disability Owned Businesses are highly encouraged to participate.

H. Bidding documents are on file and may be obtained through the following link: www.mchenry.edu/bid/.

I. This Contract calls for the construction of a "public work," within the meaning of the Illinois Prevailing Wage Act, 820 ILCS 130/.01 et seq. ("the Act"). The Act Requires contractors and subcontractors to pay laborers, workers and mechanics performing services on public works projects no less than the "prevailing rate of wages" (hourly cash wages plus fringe benefits) in the county where the work is performed. For information regarding current prevailing wage rates, please refer to the Illinois Department of Labor's website at: http://www.illinois.gov/idol/Laws-Rules/CONMED/Pages/Rates.aspx. All contractors and subcontractors rendering services under this contract must comply with all requirements of the Act, including, but not limited to, all wage, notice, record keeping duties, and related Equal Employment Opportunity Laws. Failure to comply with said Act will result in penalties and fines.

J. All questions regarding any matter concerning this Invitation to Bid must be submitted in writing to Mr. David Sikorski, Demonica Kemper Architects. Questions must be emailed to dsikorski@dka-design.com, with "MCC 2024 Renovations – Bid Package 2" in the subject line. No questions will be addressed after 5:00 PM (CST), on November 6, 2024.

END OF SECTION 00 11 13

SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

Sealed proposals are invited for the 2024 Renovations – Bid Package 2 for McHenry County College pursuant to specifications. Contractors who do not submit a bid or who do not respond with a "no bid" will be removed from our contractor list for this item.

PROPOSALS:
Proposals will be received at the place, date, and time hereinafter designated.

PLACE: McHenry County College
Room A246
8900 US Hwy 14
Crystal Lake, IL 60012

DATE: November 12, 2024

TIME: 9:30 a.m. prevailing time (FAXES ARE NOT ACCEPTABLE)

Proposals received after this time will not be accepted.

Proposals must be made in accordance with the instructions contained herein. They shall be submitted on the forms furnished in a sealed envelope, plainly marked, with the Bidder's Name and Address and the notation:

BID: **2024 Renovations – Bid Package 2**
McHenry County College

Bids will be publicly opened and read aloud on November 12, 2024, following the receipt of bids at 10:00 a.m., in Board Room A217.

TAX EXEMPTION:
McHenry County College is exempt from Federal, State, and Municipal taxes.

SIGNATURE ON BIDS: McHenry County College requires the signature on bid documents to be that of an authorized representative of said company.

Each bidder, by making his bid, represents that he has read and understands the bidding documents and that these instructions to bidders are a part of the specifications.

BIDDING PROCEDURES:
No bid shall be modified, withdrawn, or cancelled for ninety (90) days after the bid opening date without the consent of the College Board of Trustees.

Changes or corrections may be made in the bid documents after they have been issued and before bids are received. In such case, a written addendum describing the change or correction will be issued by the College to all bidders of record. Such addendum shall take precedence over that portion of the documents concerned, and shall become part of the bid documents. Except in unusual cases, addendum will be issued to reach the bidders at least five (5) days prior to date established for receipt of bids.

Each bidder shall carefully examine all bid documents and all addenda thereto, and shall thoroughly familiarize themselves with the detailed requirements thereof prior to submitting a proposal. Should a bidder find discrepancies or ambiguities in, or omissions from documents, or should they be in doubt as to their meaning, they shall, at once, and in any event, not later than ten (10) days prior to bid due date, notify the College who will, if necessary, send written addendum to all bidders. The college will not be responsible for any oral instructions. After bids are received, no allowance will be made for oversight by bidder.

Bidders shall submit three (3) complete copies (one original and two copies) of the Bid Forms including the following documents:

1. Document 00 41 13 - Bid Form
2. Document 00 43 13 – Bid Bond
3. Document 00 43 15 - Contractor Certification
4. Document 00 43 29 - W-9
5. Document 00 43 39 - Business Enterprise Program Participation and Utilization Plan
6. Document 00 43 43 – Certificate of Compliance with Illinois Prevailing Wage Law
7. Document 00 44 00 - Substitution Sheet

SITE EXAMINATION:
Bidder shall examine the project site before submitting a bid. A visit to the project site may be arranged for Bidders by contacting Mr. Dave Dammon, Asst. Vice President for Facilities Management, (815) 455-8564.

A MANDATORY Pre-Bid Meeting will be held on October 29, 2024, at 10:00 a.m., in Board Room A217. Representatives from the College and the Architect's office will be present to answer questions regarding bidding procedures and project requirements.

SUBSTITUTIONS:
Each bidder represents that his bid is based upon the materials and equipment described in the bidding documents. Any dealer bidding an equal product must specify brand name, model number, and supply specifications of product. The Board shall be the sole judge of whether an article shall be deemed to be equal. A bidder's failure to meet the minimum specifications as listed may result in disqualification of his bid.

REJECTION OF BIDS: The bidder acknowledges the right of the College Board to reject any or all proposals and to waive informality or irregularity in any proposal received and to award each item to different bidders or all items to a single bidder. In addition, the bidder recognizes the right of the College Board to reject a proposal if the proposal is in any way incomplete or irregular. The College Board may also award, at its discretion, only certain items quoted on. The College Board also reserves the right to reject the proposal of a Bidder who has previously failed to perform properly or complete on time contracts of a similar nature, or a bid of a Bidder when investigation shows that Bidder is not in a position to perform the contract.

ACKNOWLEDGEMENT OF ADDENDA:
Signature of company official on original document shall be construed as acknowledgement of receipt of any and all addenda pertaining to this specific proposal. Identification by number of addenda and date issued should be noted on all proposals submitted. FAILURE TO ACKNOWLEDGE RECEIPT OF ADDENDA ON PROPOSAL SUBMITTED MAY RESULT IN DISQUALIFICATION OF PROPOSAL.

SAMPLES:
Bidder may be required to furnish samples upon request and without charge to the College.

BID SECURITY:
A certified check or bank draft or bid bond, made payable to McHenry County College, shall be submitted with the bid in the amount of ten (10) percent of your total bid. The bid security will be forfeited by the successful bidder in the event of the bidders failure to enter into a contract. Checks or drafts of unsuccessful bidders will be returned as soon as practicable after opening and checking the bids.

INSURANCE:
The successful bidder will be required to furnish a certificate of insurance in accordance with the General Conditions.

PERFORMANCE BONDS:
The successful bidder on this proposal must furnish a performance bond and a labor and material

payment bond made out to McHenry County College, prepared on an approved form, as security for the faithful performance of their contract, within ten (10) days of their notification that their bid has been accepted. The surety thereon must be such surety company or companies as are authorized and licensed to transact business in the State of Illinois and have an minimum A-VI best rating. Attorneys in fact who sign bid bonds must file with each bond a certified copy of their power of attorney to sign said bonds. The performance and payment bonds shall be issued in an amount equal to one hundred percent (100%) of the contract sum. Such bonds shall be in force from the date of signing of the contract until one year after issuing of final certificate of payment. The cost of the bonds shall be included in the bidder's proposal.

LAWS AND ORDINANCES:
In execution of the work, the Contractor shall comply with applicable state and local laws, ordinances and regulation, the rules and regulations of the Board of Fire Underwriters, and OSHA standards.

DAMAGE AND NEGLIGENCE:
The Contractor agrees to indemnify and save harmless the College and employees from and against all loss, including costs and attorney's fees, by reasons or liability imposed by law upon the College for damages because of bodily injury, including death at any time resulting there from, sustained by any person or persons or on account of damage to property including loss of use thereof as provided in the General Conditions and Supplementary Conditions. College shall not be responsible for damages, delays, or failure to perform on its part resulting from acts or occurrences of force majeure. "Force majeure" means any (a) act of God, landslide, lightning, earthquake, hurricane, tornado, blizzard, floods and other adverse and inclement weather conditions; (b) fire, explosion, flood, acts of a public enemy, war, blockade, insurrection, riot or civil disturbance; (c) labor dispute, strike, work slow down, picketing, primary boycotts, secondary boycotts or boycotts of any kind and nature, or work stoppages; (d) any law, order, regulation ordinance, or requirement of any government or legal body or any representative of any such government or legal body; (e) inability to secure necessary materials, equipment, parts or other components of the project as a result of transportation difficulties, fuel or energy shortages, or acts or omission of any common carriers; or (f) any other similar cause or similar event beyond the reasonable control of College.

INVESTIGATION OF BIDDERS:
The College will make any necessary investigation to determine the ability of the bidder to fulfill the proposal requirements. McHenry County College reserves the right to reject any proposal if it is determined that the bidder is not properly qualified to carry out the obligation of the contract.

CONTRACTOR REQUIREMENTS:
The General Contractor shall employ a full-time superintendent to manage the day-to-day activities of the project. The superintendent shall be on-site at all times when subcontractors are working on-site. The superintendent shall be responsible to coordinate and manage all subcontractor work and shall have the authority to make decisions on behalf of the General Contractor.

General Contractors submitting a bid shall provide an 'AIA A305 - Contractor's Qualification Statement Form' upon request of the College immediately after the bid opening. References for a minimum of five (5) projects of similar scope and value completed within the past five (5) years. References shall include project name, owner contact information, architect's contact information, project scope, contract value, and date of completion.

General Contractors must state on the Bid Form all subcontractors intended to be used for this project. FAILURE TO DO SO MAY BE CAUSE FOR REJECTION OF BID.

PREVAILING WAGE RATE:
The successful bidder must pay not less than the prevailing hourly wage rate determined by the Illinois Department of Labor for the county where the contract is executed and the craft or type of worker needed to execute the contract. See the prevailing wage scale attached. If, during the course of work under this contract, the Department of Labor revises the prevailing rate hourly wages to be paid under this contract for any trade or occupation, Owner will notify Contractor and each Subcontractor of the changes in the prevailing rate of hourly wages. Contractor shall have the sole responsibility and duty to ensure that the

revised prevailing rate of hourly wages is paid by contractor and all Subcontractors to each worker to whom a revised rate is applicable. Revisions to the prevailing wage as set forth above shall not result in an increase in the Contract Sum.

ILLINOIS STEEL PRODUCTS PROCUREMENT ACT:
To the extent permitted by law, the project will be subject to all provisions of the "Steel Products Procurement Act" (30 ILCS 565 et. seq.) as it may be amended from time to time.

OTHER:
Sex Offender Registration Requirement Notification: Illinois Compiled Statutes (730 ILCS 150 3) requires that any person who is required by law to register as a sex offender and who is either a student or an employee at an institution of higher education, must also register with the Office of Public Safety of the institution they are employed by or attending. For purposes of this act, a student or employee is defined as anyone working at or attending the institution for a period of five (5) days or an aggregate period of more than thirty (30) days during a calendar year. THIS INCLUDES PERSONS OPERATING AS OR EMPLOYED BY AN OUTSIDE CONTRACTOR AT THE INSTITUTION. Anyone meeting the above requirements is required to register within five (5) days of enrolling or becoming employed. Persons failing to register are subject to criminal prosecution.

Substance Abuse Prevention: The successful bidder must comply with the Substance Abuse Prevention on Public Works Act (Public Act 95-0635.) The Act requires that every party to a public contract and every eligible bidder have a written substance abuse prevention program in place. By signing the bid form, the bidder certifies compliance to the conditions of this Act.

Human Rights Act: The College complies with the Human Rights Act (Public Act 88-1257.) The Act requires that every party to a public contract and every eligible bidder have written sexual harassment policies as described in this Act. By signing the bid form, the bidder certifies compliance to the conditions of this Act.

Concealed Carry Act: The College has established rules and regulations in accordance with the "Illinois Firearm Concealed Carry Act." See section 00 21 00 for detailed information.

BID QUANTITIES:
The College Board will reserve the right to increase or decrease, within reasonable limits, such quantities as need requires and at the unit price stated.

BID AWARDS:
The successful contractor, and/or any contractor shall not proceed on this bid until it receives a Notice to Proceed from the college. Failure to comply is the risk of that contractor.

END OF SECTION 00 21 13

SECTION 00 41 13 - BID FORM

To: McHenry County College
8900 US Hwy 14
Crystal Lake, IL 60012

Project: 2024 Renovations – Bid Package 2

Date: _____

Submitted by:

_____

_____

_____
(Full name and address)

PART 1 - OFFER

Having examined the site and having familiarized itself with the conditions affecting the cost of the work associated with the project and with the bidding documents, Bidder hereby proposes to perform everything required and to furnish all labor, materials, necessary tools, expendable equipment, and transportation services necessary to complete in a workmanlike manner the subdivision of work stated above in accordance with the bidding documents for the following sums:

Base Bid:

We have included, attached herewith, the Bid Bond as required by the Instructions to Bidders.

The Bidder agrees to perform the work for the lump sum amount of:

TOTAL BASE BID $_____ (in figures)

_____ (in words)

Allowances:

The undersigned hereby states that all allowance amounts, as described in Section 01 21 00, are included in the Total Base Bid proposal amount listed above.

ALLOWANCE NO. 1: Unforseen Condition Allowance of $25,000.00

ALLOWANCE NO. 2: Fire Wall Allowance of $25,000.00

Alternate Bids:

The undersigned hereby states the net amount of decrease or increase to the Lump Sum Base Bid for the following Alternates as described in Section 01 23 00.

ALTERNATE No. 1: Deduct from the Lump Sum Base Bid to eliminate the Liquidated Damages Clause from the Contract.

Total, Alternate No. 1: $ _____

ALTERNATE No. 2: Deduct from the Lump Sum Base Bid to eliminate the entire scope of work at the Toilet Room Renovation in the First Floor of Building D.

Total, Alternate No. 2: $ _____

ALTERNATE No. 3: Deduct from the Lump Sum Base Bid to eliminate the entire scope of work at the Server Room Cooling System Replacement in the First Floor of Building A.

Total, Alternate No. 3: $ _____

ALTERNATE No. 4: Deduct from the Lump Sum Base Bid to leave the raised flooring areas, indicated on the drawing, under the existing server racks / equipment as existing to remain in lieu of a new raised flooring system at the Server Room Cooling System Replacement in the First Floor of Building A. Refer to architectural drawings for location and additional details. Alternate No. 4 will not apply if Alternate No. 3 is selected.

Total, Alternate No. 4: $ _____

ALTERNATE No. 5: Add to the Lump Sum Base Bid to raise the section of the Hot Water Supply / Hot Water Return piping at the Library Renovation in the Second Floor of Building A.

Total, Alternate No. 5: $ _____

PART 3- ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for thirty (90) days from the Bid closing date.

If the bid is accepted by the Owner within the time period stated above, we will:

A. Execute the Agreement within ten (10) days of receipt of Notice of Award.

B. Furnish the required bonds within ten (10) days of receipt of Notice of Award in the form described in the Supplementary Conditions.

C. Furnish the required Certificate of Insurance within ten (10) days of receipt of Notice of Award in the form and amounts described in the Supplementary Conditions.

D. Commence work as established by the written Notice to Proceed.

If this Bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bonds(s), the Security Deposit shall be forfeited as damages to the Owner by reason of our failures.

In the event our Bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

PART 4 - CONTRACT TIME

If the Bid is accepted, we will:

A. Complete the work in manner consistent to meet the requirements of the schedule.

B. Contractor has examined the Schedule included in these documents and takes no exception, or records the following exceptions:

_____

_____

PART 5 - CONTRACTOR'S FEES FOR CHANGES IN THE WORK

Lump Sum or Time and Materials Changes: We, the undersigned bidder, agree that the following percentages for overhead and profit shall be added to costs for the net amount of work added to, or deleted from, the contract by written lump sum or time and material change orders recommended by the Architect and approved by the Owner:

A. On Contractor's direct net cost: 15%, with a minimum fee of one hundred dollars ($100.00).
B. On first-tier Subcontractor's net cost: 5%, with a minimum fee of fifty dollars ($50.00). Net cost includes all sub-subcontractors work, and excludes subcontractors (all tiers) overhead and profit amounts.

Note: Insurance, bond, and taxes are considered as job cost items and are included in the percentages listed above.

PART 6 - ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted therein have been considered and all costs thereto are included in the Bid Sum.

Addendum # ____ Dated _____ Addendum # ____ Dated _____

Addendum # ____ Dated _____ Addendum # ____ Dated _____

PART 7 - SUBCONTRACTORS

Identify below which work will be completed by the General Contractor's own forces and which work will be completed by first tier Subcontractors. Include Subcontractors name and estimated contract amount.

Scope of Work	GC/Sub.	Name	Est. Contract Amount
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

PART 8 - BID FORM SIGNATURE(S)

The Corporate Seal of:

_____
(Bidder – please print the full name of your Proprietorship or Corporation)

Was hereunto affixed in the presence of:

_____ _____
(Authorized signing officer) (Title)

(Seal)

END OF SECTION 00 41 13

SECTION 00 43 13 – BID BOND

1.1 BID BOND INFORMATION

A. KNOW ALL MEN BY THESE PRESENTS, THAT WE _____ as Principal, hereinafter called the Principal, and _____ corporation duly organized under the laws of the State of Illinois as Surety, are held and firmly bound unto _____ as Obligee, hereinafter called Obligee, in the sum of

_____
Dollars ($_____) for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

B. WHEREAS, the Principal has submitted a bid for:

_____

C. NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

D. Signed and sealed this ____ day of _____, 2024.

E. _____
(Principal) (Seal)

F. _____
(Witness) (Title)

G. _____
(Surety) (Seal)

END OF SECTION 00 43 13

SECTION 00 43 15 - CONTRACTOR CERTIFICATION

Illinois Revised Stature 1987
Chapter 38, Sections 33E-3 and 33E-4

The undersigned hereby certifies that it is not barred from bidding on this contract as a result of violation of either Section 33E-3 (bid rigging) or 33E-4 (bid rotating) of the Illinois Revised Statutes 1987, Chapter 38.

Under penalty of perjury, the undersigned Contractor certifies that this bid has not been arrived at collusively or otherwise in violation of Federal or Illinois antitrust laws.

Company Name _____

By * _____

Address _____

City/State/ZIP _____

* Must be actual signature in ink of a representative of Contractor authorized to legally commit the Contractor.

Section 33E-5(b) pertains to disclosure of information related to the terms of a bid and any bidder's responsiveness to a request for bids. Specifically, district officials or employees must not knowingly open a sealed bid at a time or place other than as specified by the district. Also, any official who knowingly discloses any information related to the terms of a sealed bid or any bidder's responsiveness to the request for bids commits a class 3 felony. This section does allow, however, that no violation occurs if any disclosure made to an interested person also is made generally available to the public. **CONSEQUENTLY, COLLEGES SHOULD BE CAUTIOUS NOT TO DISCLOSE ANY INFORMATION THAT IS NOT RELEASED TO THE PUBLIC.**

Section 33E-6 contains several provisions potentially impacting College purchasing procedures. **SPECIFICALLY, A PERSON COMMITS A CLASS 4 FELONY WHEN INFORMATION CONCERNING THE SPECIFICATIONS OF A CONTRACT IS KNOWINGLY CONVEYED TO A BIDDER OR PROSPECTIVE BIDDER OTHER THAN THROUGH THE BID INVITATION, PRE-BID CONFERENCE, OR CONTRACT SOLICITATION PROCEDURE.** Thus, once a IFB for a particular contract is released, MCC cannot respond to individual inquiries from bidders. Likewise, no information may be volunteered concerning potential Subcontractors if the contract involves subcontracting work.

END SECTION 00 43 15

SECTION 00 43 25 – SUBSTITUTION SHEET

1.1 SUBSTITUTION INFORMATION

A. All bids shall be based upon the provisions of the proposed Contract Documents.

B. Bidders desiring to make substitutions for "proprietary brands" specified shall list such proposed substitutions below, together with the amount to be added or deducted from the amounts of their base bids.

C. The Owner reserves the right to reject all such substitutions, and such substitutions will not be used to determine the low bid.

D. Complete descriptions and technical data shall accompany all proposed substitutions.

E. Manufacturer's names and material approved by the Architect during the bidding time, but not shown in Addenda, must be listed below if said material is to be considered.

F. PRODUCT SPECIFIED & PROPOSED ADD/DEDUCT AMOUNT

_____

_____

_____

_____

_____

_____

_____

_____

G. Name of Bidder: _____

H. Date: _____

END OF SECTION 00 43 25

Form **W-9**
(Rev. January 2011)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification (required): ☐ Individual/sole proprietor ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶

☐ Exempt payee

☐ Other (see instructions) ▶

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

Employer identification number

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here Signature of U.S. person ▶ Date ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

Cat. No. 10231X — Form **W-9** (Rev. 1-2011)

SECTION 00 43 39 – MCC BUSINESS ENTERPRISE PROGRAM - MINORITIES, FEMALES, AND PERSONS WITH DISABILITY PARTICIPATION AND UTILIZATION PLAN

The Business Enterprise Program for Minorities, Females, and Persons with Disabilities Act (BEP) establishes certain goals for community colleges contracting with businesses that are owned and controlled by persons who are minorities (MBE), women (WBE), or persons with disabilities (DBE) (collectively, BEP certified vendor(s)).

Contract Goal to be Achieved by Vendor: This solicitation includes a specific BEP participation goal of 20% of the total dollar amount of the contract.

The BEP participation goal is applicable to all bids or offers. McHenry County College (College) will award this contract to a Vendor that meets the goal or makes good faith efforts to meet the goal. This goal is also applicable to change orders and allowances within the scope of work provided by the BEP certified vendor. If Vendor is a BEP certified vendor, the entire goal is met and no subcontracting with a BEP certified vendor is required; however, Vendor must submit a Utilization Plan indicating that the goal will be met by self-performance. Failure to complete a Utilization Plan or provide good faith effort documentation shall render the bid or offer non-responsive or not responsible and subject to rejection and/or disqualification in the College's sole discretion.

The following are guidelines for Vendor's completion of the Utilization Plan. **Please read the guidelines carefully.** A format for the Utilization Plan is included in this section. Vendor should include any additional information that will add clarity to Vendor's proposed utilization of certified BEP vendors to meet the targeted goal. The Utilization Plan must demonstrate that Vendor has either: (1) met the entire contract goal or (2) made good faith efforts towards meeting the goal. Any submission of good faith efforts by Vendor shall be considered as a request for a full or partial waiver.

To meet the College's BEP participation goals, Vendor, or Vendor's proposed Subcontractor(s), must be certified with the Business Enterprise Council as a BEP certified vendor. If Vendor or Vendor's proposed Subcontractor(s) are not BEP certified vendors but do meet the definition of MBE, WBE, or DBE companies as set forth in 30 ILCS 575/2, Vendor shall have the burden of submitting sufficient evidence of the company's ownership. The College shall have the sole discretion of whether to accept non-BEP certified vendors and applying said contracts towards its BEP participation goals.

1. If applicable where there is more than one prime vendor, the Utilization Plan should include an executed Joint Venture Agreement specifying the terms and conditions of the relationship between the parties and their relationship and responsibilities to the contract. The Joint Venture Agreement must clearly evidence that the BEP certified vendor will be responsible for a clearly defined portion of the work and that its responsibilities, risks, profits and contributions of capital, and personnel are proportionate to its ownership percentage. It must include specific details related to the parties' contributions of capital, personnel, and equipment and share of the costs of insurance and other items; the scopes to be performed by the BEP certified vendor under its supervision; and the commitment of management, supervisory personnel, and operative personnel employed by the BEP certified vendor to be dedicated to the performance of the contract. Established Joint Venture Agreements will only be credited toward BEP goal achievements for specific work performed by the BEP certified vendor. **Each party to the Joint Venture Agreement must execute the bid or offer prior to submission of the bid or offer to the College.** The contract will not be awarded to Vendor unless the College approves the Vendor's Utilization Plan and Joint Venture Agreement, if applicable.

2. **Calculating BEP Certified Vendor Participation:** The Utilization Plan documents work anticipated to be performed, or goods/equipment provided, by all BEP certified vendors and paid for upon satisfactory completion/delivery. Only the value of payments made for the work actually performed by

BEP certified vendors is counted toward the contract goal. Applicable guidelines for counting payments attributable to contract goals are summarized below:

2.1. The value of the work actually performed or goods/equipment provided by the BEP certified vendor shall be counted towards the goal. The entire amount of that portion of the contract that is performed by the BEP certified vendor, including supplies purchased or equipment leased by the BEP certified vendor shall be counted, except supplies purchased and equipment rented from the Prime Vendor submitting this bid or offer.

2.2. A vendor shall count the portion of the total dollar value of the BEP contract equal to the distinct, clearly defined portion of the work of the contract that the BEP certified vendor performs toward the goal. A vendor shall also count the dollar value of work subcontracted to other BEP certified vendors. Work performed by the non-BEP certified party shall not be counted toward the goal. **Work that a BEP certified vendor subcontracts to a non-BEP certified vendor will not count towards the goal.**

2.3. A Vendor shall count toward the goal 100% of its expenditures for materials and supplies required under the contract and obtained from BEP certified vendor manufacturers, regular dealers, or suppliers. A Vendor shall count toward the goal the following expenditures to BEP certified vendors that are not manufacturers, regular dealers, or suppliers:

2.3.1. The fees or commissions charged for providing a bona fide service, such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for performance of the contract, provided that the fee or commission is determined by the College to be reasonable and not excessive as compared with fees customarily allowed for similar services.

2.3.2. The fees charged for delivery of materials and supplies required by the contract (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer or a supplier of the materials and supplies being procured, provided that the fee is determined by the College to be reasonable and not excessive as compared with fees customarily allowed for similar services. The BEP certified vendor's trucking firm must be responsible for the management and supervision of the entire trucking operation for which it is responsible on the contract, and must itself own and operate at least one fully licensed, insured and operational truck used on the contract.

2.3.3. The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the contract, provided that the fee or commission is determined by the College to be reasonable and not excessive as compared with fees customarily allowed for similar services.

2.4. BEP certified vendors who are performing the contract as second tier subcontractors may be counted in meeting the established BEP goal for this contract as long as the Prime Vendor can provide documentation indicating the utilization of these vendors.

2.5. A Vendor shall count towards the goal only expenditures to firms that perform a commercially useful function in the work of the contract. A Vendor shall not count towards the goal expenditures that are not direct, necessary and related to the work of the contract. Only the amount of services or goods that are directly attributable to the performance of the contract shall be counted. Ineligible expenditures include general office overhead or other Vendor support activities.

3. **Good Faith Effort Procedures**: Enclosed and sealed with the Vendor's bid documents, the Vendor must submit a: (1) Utilization Plan and (2) either Letters of Intent or subcontract documents that meet or exceed the published goal. If Vendor cannot meet the stated goal, Vendor must submit documents to support the good faith efforts it undertook to meet the goal. The College has the right to reject Vendor's bid as not-responsible and/or not responsive if the College or the Business Enterprise Council determine, in either of their sole discretion, that Vendor failed to make a good faith effort to meet the MBE goals. The College may also accept and enter into a contract with a Vendor that can provide sufficient evidence of MBE, WBE or DBE status of Vendor or its proposed subcontractors and/or sub-vendors in compliance with the Illinois Business Enterprise for Minorities, Females, and Persons with Disabilities Act. If the College or the Council determine that Vendor has made good faith efforts to meet the goal, the College may award the contract provided that Vendor is otherwise eligible for award.

4. **Contract Compliance:** Compliance with this section is an essential part of the contract. The following administrative procedures and remedies govern Vendor's compliance with the contractual obligations established by the Utilization Plan. **After approval of the Utilization Plan and award of the contract, the Utilization Plan becomes part of the contract.**

4.1. The Utilization Plan may not be amended after contract execution without the College's prior written approval. Vendor may not make changes to its contractual BEP certified vendor commitments or substitute BEP certified vendors without the College's prior written approval. The Vendor's request to substitute BEP certified vendors must state the specific reasons for the change or substitutions. Unauthorized changes or substitutions, including performing the work designated for a BEP certified vendor with Vendor's own forces, shall be a violation of the Utilization Plan and a breach of the contract, and shall be cause to terminate the contract, and/or seek other contract remedies or sanctions.

4.2. Vendor shall maintain a record of all relevant data with respect to the utilization of BEP certified vendors, including but without limitation, payroll records, invoices, canceled checks and books of account for a period of at least three years after the completion of the contract. The College shall have the right to access to these records upon 48 hours written demand. The College shall have the right to obtain from Vendor any additional data reasonably related or necessary to verify any representations by Vendor.

4.3. The College reserves the right to withhold payment to Vendor to enforce these provisions and Vendor's contractual commitments. Final payment shall not be made pursuant to the contract until Vendor submits sufficient documentation demonstrating compliance with its Utilization Plan.

UTILIZATION PLAN

The Utilization Plan and Letter of Intent must be sealed and submitted with Vendor's Bid Documents.

(Vendor) submits the following Utilization Plan as part of our bid or offer in accordance with the requirements of the BEP Program Status and Participation section of the solicitation for McHenry County College's Greenhouse Project.

Vendor submits the following statement:

☐ Vendor is a BEP certified firm and plans to fully meet the goal through self-performance.

☐ Vendor has identified BEP certified subcontractor(s) to fully meet the established goal and submits the attached executed Letter(s) of Intent; or

☐ Vendor has made good faith efforts towards meeting the entire goal, or a portion of the goal, and hereby requests a waiver (complete checklist below).

Vendor's designee responsible for compliance with this BEP goal:

Name: Title:

Telephone: Email:

BEP Utilization Plan

The following firms will be utilized to meet the goals of the BEP Program:

Name of Firm	Contract Value	Description of Work	% of Goal
Total			

DEMONSTRATION OF GOOD FAITH EFFORTS TO ACHIEVE GOAL AND REQUEST FOR WAIVER

If the BEP participation goal was not achieved, Vendors must provide documented evidence of good faith efforts to achieve the goal.

Below is a checklist of actions that will be used to evaluate a Vendor's Demonstration of Good Faith Efforts and Request for Waiver. **Please check the actions which you completed.** If any of the following actions are not completed, please attach a detailed written explanation indicating why such action was not completed. If any other efforts were made to obtain BEP participation in addition to the items listed below, attach a detailed description of such efforts. The College reserves the right to review and audit the results of the Vendor's good faith efforts.

☐ Utilize the Sell2Illinois website: www2.illinois.gov/cms/business to identify BEP certified vendors within the respective commodity/service codes denoted above and at a minimum email all listed vendors and solicit quotes from all vendors who express an interest via follow-up emails or telephone calls.

☐ Solicit through all reasonable and available means (e.g., attendance at a vendor conference, advertising and/or written notices) the interest of BEP certified vendors that have the capability to perform the work of the contract. Vendor must solicit this interest within sufficient time to allow the BEP certified vendors to respond to the solicitation. Vendor must determine with certainty if the BEP certified vendors are interested by taking appropriate steps to follow up initial solicitations and encourage them to submit a bid or proposal. Vendor must provide interested BEP certified vendors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding promptly to the solicitation.

☐ Select portions of the work to be performed by BEP certified vendors in order to increase the likelihood that the goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate BEP certified vendor participation, even when Vendor might otherwise prefer to perform these work items with its own forces.

☐ Make a portion of the work available to BEP certified vendors and selecting those portions of the work or material needs consistent with their availability, so as to facilitate BEP certified vendor participation.

☐ Negotiate in good faith with interested BEP certified vendors. Evidence of such negotiation must include the names, addresses, email addresses, and telephone numbers of BEP certified vendors that were considered and an explanation as to why an agreement could not be reached.

☐ Thoroughly investigate the capabilities of BEP certified vendors and not reject them as unqualified without documented reasons.

☐ Make efforts to assist interested BEP certified vendors in obtaining lines of credit or insurance as required by the College.

☐ Make efforts to assist interested BEP certified vendors in obtaining necessary equipment, supplies, materials, or related assistance or services.

GOOD FAITH EFFORTS CONTACT LOG

Use this Log to document **all** contacts and responses (telephone, e-mail, fax, etc.) regarding the solicitation of BEP certified vendors within the specific scope of work selected. It is not necessary to show contacts with BEP certified vendors who are identified on the Letter(s) of Intent. Keep and submit copies of all emails sent and received from prospective BEP vendors. Include a copy of the commodity list or scope of work you solicited prospective BEP vendors to perform. Duplicate this log as necessary; do not limit your contacts to the number of spaces shown.

Name of Certified BEP Vendor	Date	Method of Contact	Scope of Work Solicited	Reason Agreement Was Not Reached

END SECTION 00 43 39

00 43 43 – CERTIFICATE OF COMPLIANCE WITH THE ILLINOIS PREVAILING WAGE LAW

Every eligible bidder and contractor/vendor shall comply with the employment section of Public Contracts provision of the Prevailing Wage Act, 820 ILCS 130/1, as amended.

McHenry County College District 528
8900 U.S. Highway 14
Crystal Lake, IL 60012

INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS
Certificate of Compliance with the Illinois Prevailing Wage Law

This letter is to certify that_____
(name of company)

is in compliance with Section 39A9 of Chapter 48 of the Illinois Revised Statutes and all amendments pertaining to the payment of prevailing wages as established by the department of labor, to all laborers, workers, and mechanics performing work under this agreement/contract.

Company street address_____

City _____

County _____State_____Zip_____

Contact name _____contact phone_____

Sworn and subscribed to me on this _____day of_____, 20_____; before me, notary public

appointed in_____County for the state of Illinois.

_____ _____
Signature of Notary printed name

_____
Seal

_____ _____ _____
Commission expiration date city of residence county of residence

END SECTION 00 43 43

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
McHenry County College -Project Master

THE OWNER:
(Name, legal status and address)
The Board of Trustees of McHenry County College
8900 US Highway 14
Crystal Lake, Illinois 60012

THE ARCHITECT:
(Name, legal status and address)
Demonica Kemper Architects
125 N. Halsted Street, Suite 301
Chicago, IL 60661

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Init.
/

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

INDEX
(Topics and numbers in bold are section headings.)

Acceptance of Nonconforming Work
9.6.6, 9.9.3, **12.3**
Acceptance of Work
9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3
Access to Work
3.16, 6.2.1, 12.1
Accident Prevention
10
Acts and Omissions
3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5, 10.2.8, 13.4.2, 13.7, 14.1, 15.2
Addenda
1.1.1, 3.11
Additional Costs, Claims for
3.7.4, 3.7.5, 6.1.1, 7.3.7.5, 10.3, 15.1.4
Additional Inspections and Testing
9.4.2, 9.8.3, 12.2.1, **13.5**
Additional Insured
11.1.4
Additional Time, Claims for
3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.5**
Administration of the Contract
3.1.3, **4.2**, 9.4, 9.5
Advertisement or Invitation to Bid
1.1.1
Aesthetic Effect
4.2.13
Allowances
3.8, 7.3.8
All-risk Insurance
11.3.1, 11.3.1.1
Applications for Payment
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.6.3, 9.7, 9.10, 11.1.3
Approvals
2.1.1, 2.2.2, 2.4, 3.1.3, 3.10.2, 3.12.8, 3.12.9, 3.12.10, 4.2.7, 9.3.2, 13.5.1
Arbitration
8.3.1, 11.3.10, 13.1, 15.3.2, **15.4**
ARCHITECT
4
Architect, Definition of
4.1.1
Architect, Extent of Authority
2.4, 3.12.7, 4.1, 4.2, 5.2, 6.3, 7.1.2, 7.3.7, 7.4, 9.2, 9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.5.1, 13.5.2, 14.2.2, 14.2.4, 15.1.3, 15.2.1
Architect, Limitations of Authority and Responsibility
2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2, 9.5.3, 9.6.4, 15.1.3, 15.2
Architect's Additional Services and Expenses
2.4, 11.3.1.1, 12.2.1, 13.5.2, 13.5.3, 14.2.4
Architect's Administration of the Contract
3.1.3, 4.2, 3.7.4, 15.2, 9.4.1, 9.5
Architect's Approvals
2.4, 3.1.3, 3.5, 3.10.2, 4.2.7
Architect's Authority to Reject Work
3.5, 4.2.6, 12.1.2, 12.2.1
Architect's Copyright
1.1.7, 1.5
Architect's Decisions
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3, 7.3.7, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1, 13.5.2, 15.2, 15.3
Architect's Inspections
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.5
Architect's Instructions
3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.5.2
Architect's Interpretations
4.2.11, 4.2.12
Architect's Project Representative
4.2.10
Architect's Relationship with Contractor
1.1.2, 1.5, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.2, 4.1.3, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3.7, 12, 13.4.2, 13.5, 15.2
Architect's Relationship with Subcontractors
1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3.7
Architect's Representations
9.4.2, 9.5.1, 9.10.1
Architect's Site Visits
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.5
Asbestos
10.3.1
Attorneys' Fees
3.18.1, 9.10.2, 10.3.3
Award of Separate Contracts
6.1.1, 6.1.2
Award of Subcontracts and Other Contracts for Portions of the Work
5.2
Basic Definitions
1.1
Bidding Requirements
1.1.1, 5.2.1, 11.4.1
Binding Dispute Resolution
9.7, 11.3.9, 11.3.10, 13.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, 15.4.1
Boiler and Machinery Insurance
11.3.2
Bonds, Lien
7.3.7.4, 9.10.2, 9.10.3
Bonds, Performance, and Payment
7.3.7.4, 9.6.7, 9.10.3, 11.3.9, **11.4**
Building Permit
3.7.1

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

Capitalization
1.3
Certificate of Substantial Completion
9.8.3, 9.8.4, 9.8.5
Certificates for Payment
4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.3
Certificates of Inspection, Testing or Approval
13.5.4
Certificates of Insurance
9.10.2, 11.1.3
Change Orders
1.1.1, 2.4, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.6, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.3.1.2, 11.3.4, 11.3.9, 12.1.2, 15.1.3
Change Orders, Definition of
7.2.1
CHANGES IN THE WORK
2.2.1, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.3.9
Claims, Definition of
15.1.1
CLAIMS AND DISPUTES
3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4
Claims and Timely Assertion of Claims
15.4.1
Claims for Additional Cost
3.2.4, 3.7.4, 6.1.1, 7.3.9, 10.3.2, **15.1.4**
Claims for Additional Time
3.2.4, 3.7.4, 6.1.1, 8.3.2, 10.3.2, **15.1.5**
Concealed or Unknown Conditions, Claims for
3.7.4
Claims for Damages
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 14.1.3, 14.2.4, 15.1.6
Claims Subject to Arbitration
15.3.1, 15.4.1
Cleaning Up
3.15, 6.3
Commencement of the Work, Conditions Relating to
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.3.1, 11.3.6, 11.4.1, 15.1.4
Commencement of the Work, Definition of
8.1.2
Communications Facilitating Contract Administration
3.9.1, **4.2.4**
Completion, Conditions Relating to
3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 13.7, 14.1.2
COMPLETION, PAYMENTS AND
9
Completion, Substantial
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 13.7
Compliance with Laws
1.6, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 10.2.2, 11.1, 11.3, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3
Concealed or Unknown Conditions
3.7.4, 4.2.8, 8.3.1, 10.3
Conditions of the Contract
1.1.1, 6.1.1, 6.1.4
Consent, Written
3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 11.3.1, 13.2, 13.4.2, 15.4.4.2
Consolidation or Joinder
15.4.4
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
1.1.4, **6**
Construction Change Directive, Definition of
7.3.1
Construction Change Directives
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1
Construction Schedules, Contractor's
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2
Contingent Assignment of Subcontracts
5.4, 14.2.2.2
Continuing Contract Performance
15.1.3
Contract, Definition of
1.1.2
CONTRACT, TERMINATION OR SUSPENSION OF THE
5.4.1.1, 11.3.9, **14**
Contract Administration
3.1.3, 4, 9.4, 9.5
Contract Award and Execution, Conditions Relating to
3.7.1, 3.10, 5.2, 6.1, 11.1.3, 11.3.6, 11.4.1
Contract Documents, Copies Furnished and Use of
1.5.2, 2.2.5, 5.3
Contract Documents, Definition of
1.1.1
Contract Sum
3.7.4, 3.8, 5.2.3, 7.2, 7.3, 7.4, **9.1**, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.3.1, 14.2.4, 14.3.2, 15.1.4, 15.2.5
Contract Sum, Definition of
9.1
Contract Time
3.7.4, 3.7.5, 3.10.2, 5.2.3, 7.2.1.3, 7.3.1, 7.3.5, 7.4, 8.1.1, 8.2.1, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 14.3.2, 15.1.5.1, 15.2.5
Contract Time, Definition of
8.1.1
CONTRACTOR
3
Contractor, Definition of
3.1, 6.1.2

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

Contractor's Construction Schedules
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2
Contractor's Employees
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1
Contractor's Liability Insurance
11.1
Contractor's Relationship with Separate Contractors and Owner's Forces
3.12.5, 3.14.2, 4.2.4, 6, 11.3.7, 12.1.2, 12.2.4
Contractor's Relationship with Subcontractors
1.2.2, 3.3.2, 3.18.1, 3.18.2, 5, 9.6.2, 9.6.7, 9.10.2, 11.3.1.2, 11.3.7, 11.3.8
Contractor's Relationship with the Architect
1.1.2, 1.5, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.1.3, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3.7, 12, 13.5, 15.1.2, 15.2.1
Contractor's Representations
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2
Contractor's Responsibility for Those Performing the Work
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8
Contractor's Review of Contract Documents
3.2
Contractor's Right to Stop the Work
9.7
Contractor's Right to Terminate the Contract
14.1, 15.1.6
Contractor's Submittals
3.10, 3.11, 3.12.4, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3, 11.1.3, 11.4.2
Contractor's Superintendent
3.9, 10.2.6
Contractor's Supervision and Construction Procedures
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.5, 7.3.7, 8.2, 10, 12, 14, 15.1.3
Contractual Liability Insurance
11.1.1.8, 11.2
Coordination and Correlation
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1
Copies Furnished of Drawings and Specifications
1.5, 2.2.5, 3.11
Copyrights
1.5, **3.17**
Correction of Work
2.3, 2.4, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**
Correlation and Intent of the Contract Documents
1.2
Cost, Definition of
7.3.7
Costs
2.4, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.7, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.3, 12.1.2, 12.2.1, 12.2.4, 13.5, 14
Cutting and Patching
3.14, 6.2.5
Damage to Construction of Owner or Separate Contractors
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 11.1.1, 11.3, 12.2.4
Damage to the Work
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 11.3.1, 12.2.4
Damages, Claims for
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 14.1.3, 14.2.4, 15.1.6
Damages for Delay
6.1.1, 8.3.3, 9.5.1.6, 9.7, 10.3.2
Date of Commencement of the Work, Definition of
8.1.2
Date of Substantial Completion, Definition of
8.1.3
Day, Definition of
8.1.4
Decisions of the Architect
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 15.2, 6.3, 7.3.7, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.5.2, 14.2.2, 14.2.4, 15.1, 15.2
Decisions to Withhold Certification
9.4.1, **9.5**, 9.7, 14.1.1.3
Defective or Nonconforming Work, Acceptance, Rejection and Correction of
2.3, 2.4, 3.5, 4.2.6, 6.2.5, 9.5.1, 9.5.2, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Definitions
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 15.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1
Delays and Extensions of Time
3.2, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.5, 15.2.5
Disputes
6.3, 7.3.9, 15.1, 15.2
Documents and Samples at the Site
3.11
Drawings, Definition of
1.1.5
Drawings and Specifications, Use and Ownership of
3.11
Effective Date of Insurance
8.2.2, 11.1.2
Emergencies
10.4, 14.1.1.2, 15.1.4
Employees, Contractor's
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1
Equipment, Labor, Materials or
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Execution and Progress of the Work
1.1.3, 1.2.1, 1.2.2, 2.2.3, 2.2.5, 3.1, 3.3.1, 3.4.1, 3.5,

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.5, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.2, 14.2, 14.3.1, 15.1.3
Extensions of Time
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.5, 15.2.5
Failure of Payment
9.5.1.3, **9.7**, 9.10.2, 13.6, 14.1.1.3, 14.2.1.2
Faulty Work
(See Defective or Nonconforming Work)
Final Completion and Final Payment
4.2.1, 4.2.9, 9.8.2, **9.10**, 11.1.2, 11.1.3, 11.3.1, 11.3.5, 12.3, 14.2.4, 14.4.3
Financial Arrangements, Owner's
2.2.1, 13.2.2, 14.1.1.4
Fire and Extended Coverage Insurance
11.3.1.1
GENERAL PROVISIONS
1
Governing Law
13.1
Guarantees (See Warranty)
Hazardous Materials
10.2.4, **10.3**
Identification of Subcontractors and Suppliers
5.2.1
Indemnification
3.17, **3.18**, 9.10.2, 10.3.3, 10.3.5, 10.3.6, 11.3.1.2, 11.3.7
Information and Services Required of the Owner
2.1.2, **2.2**, 3.2.2, 3.12.4, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 11.4, 13.5.1, 13.5.2, 14.1.1.4, 14.1.4, 15.1.3
Initial Decision
15.2
Initial Decision Maker, Definition of
1.1.8
Initial Decision Maker, Decisions
14.2.2, 14.2.4, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Initial Decision Maker, Extent of Authority
14.2.2, 14.2.4, 15.1.3, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
Injury or Damage to Person or Property
10.2.8, 10.4
Inspections
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.5
Instructions to Bidders
1.1.1
Instructions to the Contractor
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.5.2
Instruments of Service, Definition of
1.1.7
Insurance
3.18.1, 6.1.1, 7.3.7, 9.3.2, 9.8.4, 9.9.1, 9.10.2, **11**
Insurance, Boiler and Machinery
11.3.2
Insurance, Contractor's Liability
11.1
Insurance, Effective Date of
8.2.2, 11.1.2
Insurance, Loss of Use
11.3.3
Insurance, Owner's Liability
11.2
Insurance, Property
10.2.5, **11.3**
Insurance, Stored Materials
9.3.2
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1
Intent of the Contract Documents
1.2.1, 4.2.7, 4.2.12, 4.2.13, 7.4
Interest
13.6
Interpretation
1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1
Interpretations, Written
4.2.11, 4.2.12, 15.1.4
Judgment on Final Award
15.4.2
Labor and Materials, Equipment
1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2
Labor Disputes
8.3.1
Laws and Regulations
1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 9.9.1, 10.2.2, 11.1.1, 11.3, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14, 15.2.8, 15.4
Liens
2.1.2, 9.3.3, 9.10.2, 9.10.4, 15.2.8
Limitations, Statutes of
12.2.5, 13.7, 15.4.1.1
Limitations of Liability
2.3, 3.2.2, 3.5, 3.12.10, 3.17, 3.18.1, 4.2.6, 4.2.7, 4.2.12, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 10.2.5, 10.3.3, 11.1.2, 11.2, 11.3.7, 12.2.5, 13.4.2
Limitations of Time
2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 11.3.1.5, 11.3.6, 11.3.10, 12.2, 13.5, 13.7, 14, 15
Loss of Use Insurance
11.3.3
Material Suppliers
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.6, 9.10.5
Materials, Hazardous
10.2.4, **10.3**

Init.
/
AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

Materials, Labor, Equipment and
1.1.3, 1.1.6, 1.5.1, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2
Means, Methods, Techniques, Sequences and Procedures of Construction
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2
Mechanic's Lien
2.1.2, 15.2.8
Mediation
8.3.1, 10.3.5, 10.3.6, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1
Minor Changes in the Work
1.1.1, 3.12.8, 4.2.8, 7.1, **7.4**
MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2, 11.3.1
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of
9.6.6, 9.9.3, **12.3**
Nonconforming Work, Rejection and Correction of
2.3, 2.4, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2.1
Notice
2.2.1, 2.3, 2.4, 3.2.4, 3.3.1, 3.7.2, 3.12.9, 5.2.1, 9.7, 9.10, 10.2.2, 11.1.3, 12.2.2.1, 13.3, 13.5.1, 13.5.2, 14.1, 14.2, 15.2.8, 15.4.1
Notice, Written
2.3, 2.4, 3.3.1, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 11.3.6, 12.2.2.1, **13.3**, 14, 15.2.8, 15.4.1
Notice of Claims
3.7.4, 10.2.8, **15.1.2**, 15.4
Notice of Testing and Inspections
13.5.1, 13.5.2
Observations, Contractor's
3.2, 3.7.4
Occupancy
2.2.2, 9.6.6, 9.8, 11.3.1.5
Orders, Written
1.1.1, 2.3, 3.9.2, 7, 8.2.2, 11.3.9, 12.1, 12.2.2.1, 13.5.2, 14.3.1
OWNER
2
Owner, Definition of
2.1.1
Owner, Information and Services Required of the
2.1.2, **2.2**, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 11.3, 13.5.1, 13.5.2, 14.1.1.4, 14.1.4, 15.1.3
Owner's Authority
1.5, 2.1.1, 2.3, 2.4, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.1.3, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.1.3, 11.3.3, 11.3.10, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7
Owner's Financial Capability
2.2.1, 13.2.2, 14.1.1.4
Owner's Liability Insurance
11.2
Owner's Relationship with Subcontractors
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2
Owner's Right to Carry Out the Work
2.4, 14.2.2
Owner's Right to Clean Up
6.3
Owner's Right to Perform Construction and to Award Separate Contracts
6.1
Owner's Right to Stop the Work
2.3
Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2
Ownership and Use of Drawings, Specifications and Other Instruments of Service
1.1.1, 1.1.6, 1.1.7, **1.5**, 2.2.5, 3.2.2, 3.11, 3.17, 4.2.12, 5.3
Partial Occupancy or Use
9.6.6, **9.9**, 11.3.1.5
Patching, Cutting and
3.14, 6.2.5
Patents
3.17
Payment, Applications for
4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3
Payment, Certificates for
4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 13.7, 14.1.1.3, 14.2.4
Payment, Failure of
9.5.1.3, **9.7**, 9.10.2, 13.6, 14.1.1.3, 14.2.1.2
Payment, Final
4.2.1, 4.2.9, 9.8.2, 9.10, 11.1.2, 11.1.3, 11.4.1, 12.3, 13.7, 14.2.4, 14.4.3
Payment Bond, Performance Bond and
7.3.7.4, 9.6.7, 9.10.3, **11.4**
Payments, Progress
9.3, **9.6**, 9.8.5, 9.10.3, 13.6, 14.2.3, 15.1.3
PAYMENTS AND COMPLETION
9
Payments to Subcontractors
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2
PCB
10.3.1

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

Performance Bond and Payment Bond
7.3.7.4, 9.6.7, 9.10.3, **11.4**
Permits, Fees, Notices and Compliance with Laws
2.2.2, **3.7**, 3.13, 7.3.7.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION OF
10
Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.7
Progress and Completion
4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.3
Progress Payments
9.3, **9.6**, 9.8.5, 9.10.3, 13.6, 14.2.3, 15.1.3
Project, Definition of
1.1.4
Project Representatives
4.2.10
Property Insurance
10.2.5, **11.3**
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 9.9.1, 10.2.2, 11.1, 11.4, 13.1, 13.4, 13.5.1, 13.5.2, 13.6, 14, 15.2.8, 15.4
Rejection of Work
3.5, 4.2.6, 12.2.1
Releases and Waivers of Liens
9.10.2
Representations
3.2.1, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.8.2, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.1, 4.2.2, 4.2.10, 5.1.1, 5.1.2, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field Conditions by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples by Contractor
3.12
Rights and Remedies
1.1.2, 2.3, 2.4, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1, 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.2, 12.2.4, **13.4**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, **10.1**, 10.2, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.4.2, 9.10.1, 13.5
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.5
Special Inspections and Testing
4.2.6, 12.2.1, 13.5
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.11, 3.12.10, 3.17, 4.2.14
Statute of Limitations
13.7, 15.4.1.1
Stopping the Work
2.3, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2, 9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.7, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3, 11.1.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, **11.3.7**

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2, 13.7
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect
4.1.3
Substitutions of Materials
3.4.2, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
3.7.4
Successors and Assigns
13.2
Superintendent
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.7, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.3
Surety
5.4.1.2, 9.8.5, 9.10.2, 9.10.3, 14.2.2, 15.2.7
Surety, Consent of
9.10.2, 9.10.3
Surveys
2.2.3
Suspension by the Owner for Convenience
14.3
Suspension of the Work
5.4.2, 14.3
Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.7.4
Termination by the Contractor
14.1, 15.1.6
Termination by the Owner for Cause
5.4.1.1, **14.2,** 15.1.6
Termination by the Owner for Convenience
14.4
Termination of the Architect
4.1.3
Termination of the Contractor
14.2.2
TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.3, 3.3.3, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 11.4.1, 12.2.1, **13.5**
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.5, 15.2.5
Time Limits
2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 12.2, 13.5, 13.7, 14, 15.1.2, 15.4
Time Limits on Claims
3.7.4, 10.2.8, **13.7**, 15.1.2
Title to Work
9.3.2, 9.3.3
Transmission of Data in Digital Form
1.6
UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3
Unit Prices
7.3.3.2, 7.3.4
Use of Documents
1.1.1, 1.5, 2.2.5, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.4.2
Waiver of Claims by the Contractor
9.10.5, 13.4.2, 15.1.6
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.4.2, 14.2.4, 15.1.6
Waiver of Consequential Damages
14.2.4, 15.1.6
Waiver of Liens
9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, **11.3.7**
Warranty
3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.4, 12.2.2, 13.7
Weather Delays
15.1.5.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 11.4.1, 13.2, 13.4.2, 15.4.4.2
Written Interpretations
4.2.11, 4.2.12
Written Notice
2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 5.2.1, 8.2.2, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 12.2.2, 12.2.4, **13.3**, 14, 15.4.1
Written Orders
1.1.1, 2.3, 3.9, 7, 8.2.2, 12.1, 12.2, 13.5.2, 14.3.1, 15.1.2

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents included in the Project Manual, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, or (2) a Change Order.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means all of the Contractor's duties under the Contract Documents, including the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker, if any, is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§1.2.4 If any two or more provisions of the Contract Documents conflict, and such conflict relates to the quantity or quality of the Work, the Contractor agrees to provide the greater quantity and/or better quality of such Work.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner's reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner.

(Paragraphs deleted)

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall, to the extent allowed by law and by the Owner's Board Policies, have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

(Paragraphs deleted)

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. The Contractor shall provide information or other assistance as the Architect or Owner may request in connection with these obligations.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. The Owner's rights and remedies under this section are in addition to, and not a limitation of, any other rights and remedies of the Owner under the Contract Documents or otherwise.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or approved construction schedules, and fails within a five-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and reasonable attorneys' fees, and compensation for the Architect's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner within thirty (30) days after a request by the Owner.

§2.5 OWNER'S RIGHT TO AUDIT. The Contractor shall keep full and accurate records of all labor and material costs incurred and items billed in connection with the performance of the Work, which records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until three years after Final Payment. In addition, the Contractor shall make it a condition of all Subcontracts relating to the Work that all Subcontractors will keep accurate records of costs incurred and items billed in connection with their work and that such records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until three years after Subcontractor's final completion.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative. The Contractor is an independent contractor, and shall not be deemed an agent of the Owner for any reason.

§ 3.1.2 The Contractor shall perform the Work in strict accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in strict accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 The Contractor represents that it has visited the Project site, become generally familiar with local conditions under which the Work is to be performed, correlated personal observations with requirements of the Contract Documents, and has satisfied itself as to the nature and location of the Work, the general and local conditions, including those bearing upon access (including partial or total restrictions on access), transportation, delivery, disposal, staging, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical conditions of the ground, the character, quality and quantity of existing conditions to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the Work and all other matters which can in any way effect the Work or the cost thereof under this Agreement. Any failure by the Contractor to acquaint itself with all the available information concerning these conditions will not relieve the Contractor from any obligation under the Contract Documents.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering latent errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any apparent errors, inconsistencies or omissions as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 In all cases where Work interconnects with existing facilities, Contractor shall field measure and verify at the site all dimensions relating to such existing facilities. Any conflicts in the Work and the existing facilities which could have been mitigated by the Contractor's obligation to verify the dimensions of the existing facilities shall be promptly rectified by the Contractor at its own expense.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor shall coordinate inspections by governmental authorities having jurisdiction over the Work.

§ 3.3.5 No inspection performed or failed to be performed by the Owner or Architect shall be a wavier of any of the Contractor's obligations hereunder.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.4 The Contractor shall not at any time permit on the Project site any alcohol or controlled substances whether inside or outside of buildings or structures. Possession or use of any of the foregoing at or adjacent to the site shall obligate the Contractor to remove such offending personnel from the site and replace them at no additional cost to the Owner.

§3.4.5 The Contractor and any Subcontractors shall conform to labor laws of the State and various acts amendatory and supplementary thereto and to other laws, ordinances and legal requirements applicable thereto. Contractor shall enforce among all personnel directly or indirectly employed by it, and among all Subcontractors and their employees, all rules which the Owner may establish for conduct of such personnel on the site.

§3.4.6 The Contractor shall pay prevailing wages in accordance with and shall fully comply with all requirements of the Prevailing Wage Act, 820 ILCS 130/0.01, *et seq.*

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work shall strictly conform to the requirements of the Contract Documents and shall be free from defects. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Owner is tax-exempt. Notwithstanding, the Contractor shall pay any applicable sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

(2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall immediately notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work on site. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The superintendent shall be subject to approval by the Owner and shall not be replaced without the prior written consent of the Owner. The Owner shall have the right to require that the Contractor replace the superintendent, at no additional cost to the Owner, at any time during the duration of the Work if his/her performance is not satisfactory to the Owner.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the name and qualifications of a proposed superintendent. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Owner requires additional time to review. Failure of the Owner to reply within the 14 day period shall constitute notice that Owner has no initial objection to the proposed superintendent, but shall not affect Owner's right to make a subsequent rejection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent..

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.1.1 The Contractor's construction schedules shall be in a bar chart format, and shall depict, at a minimum, activity identification and durations, critical path, float, early start, early finish, late start, and late finish.

§ 3.10.1.1.1 The float in the construction schedules will not be deemed exclusively available to the Contractor or Owner, but rather shall be available to either party as needed.

§ 3.10.1.2 No less than once per month, the Contractor shall submit an updated construction schedule. The updated construction schedule shall depict actual start and completion dates for Work commenced and, if appropriate, Work completed. Additionally, the updated construction schedules shall depict updated estimates of anticipated commencement and completion dates for all upcoming Work.

§ 3.10.1.3 Submission of the initial construction schedule and monthly schedule updates shall be absolute prerequisites of certification of the Contractor's application for payment.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect. If the Contractor fails to adhere to the approved construction schedule(s), Contractor shall immediately, at its own expense, take necessary measures to remedy such failure, including addition of personnel and/or equipment, overtime, and/or additional shifts. The Owner shall be entitled to rely on Contractor's schedules for coordination of its own activities, as well as the activities of other contractors working at the Project site or on the Project.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals (collectively the "Record Documents"). These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1 The Contractor shall make the Record Documents available for inspection by the Architect upon reasonable notice. Adequate maintenance of the Record Documents shall be a prerequisite to certification of the Contractor's applications for payment.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. The Contractor shall submit Product Data for all equipment and materials incorporated into the finished Work. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Architect has specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 3.13 USE OF SITE
The Contractor shall confine operations at the site to the site access plan, if any, and to the areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING
§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP
§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. Throughout the progress of the Work the Contractor shall continually remove from the Project Site and from any adjacent property, all waste, scraps, tools, equipment, storage facilities, machinery, trailers, and vehicles no longer required for prosecution of the Work, such that the Project site remains clean, orderly, and safe.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK
The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS
The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION
§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, but only to the extent caused by the Contractor's or any Subcontractor's breach of the Contract Documents, or by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

(Paragraphs deleted)

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect and the Owner each have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

(Paragraph deleted)

§ 4.2.12 Interpretations of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. All requests for information shall be submitted to the Architect in a format acceptable to the Architect.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 If this Project is utilizing a construction manager at-risk, the construction manager at-risk shall be the "Contractor" referenced in these general conditions, and when the lowest, responsive and responsible multiple prime trade contractor(s) are identified and awarded contracts by the Owner, each such award shall constitute the automatic assignment of that trade contract by the Owner to the Contractor, and each such successful bidder shall then be known as a "Subcontractor." If this Project is utilizing a single general contractor or multiple prime trade contractors, and the Project is not utilizing a construction manager-at risk, then there shall be no such assignment. In any case, a Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

(Paragraphs deleted)

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

Each Subcontractor acknowledges: (1) that the Owner is a direct intended third party beneficiary of each Subcontract between the Contractor and Subcontractor; (2) that notwithstanding any contract provision to the contrary, Subcontractor shall be bound to perform the Work in accordance with these AIA A201 general conditions, as amended; and (3) that the Subcontractor is not a third party beneficiary of the construction management contract between Contractor and Owner.

Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

(Paragraph deleted)

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

(Paragraph deleted)

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The separate contractors shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction. For the purposes of facilitating this section only, the Contractor and separate contractors shall be deemed intended third party beneficiaries to each other's respective contracts with the Owner.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 The Owner may, without invalidating the Contract and without notice to the surety, direct changes in the Work. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.1.4 No Change Order shall be approved or paid unless preceded by written direction for Change is provided by the Owner. This requirement cannot be waived. There shall be no implicit or constructive change orders.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 No payment for changes in the Work shall be made until such change has been memorialized in an executed Change Order and the Change has been executed.

§ 7.2.3 The Contractor shall be permitted the following markups for additive changes orders, and shall be required to take the following mark-downs for deductive change orders. Additional markup for insurance or bonds will not be allowed. All change order requests must be submitted with the following backup information or they will not be

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

reviewed by the Architect or Owner: material and labor quantities, material unit costs, labor rates, and any other substantiating data to explain the change order amount.

Markups and Markdowns for Change Orders:

Additive Change Order: 10%
Deductive Change Order: 10%

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order for the purposes of defining the change and/or how payment shall be calculated, but not for the purpose of approving payment.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated change by more than 25% in a proposed Change Order or Construction Change Directive, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Upon execution by the Owner, such agreement shall be effective and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit (as provided in §7.2.3).In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

(Paragraph deleted)

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. Unless provided elsewhere in the Contract Documents, the Contractor shall achieve Final Completion within thirty (30) days following Substantial Completion.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 Extension of Contract Time pursuant to this Article 8 shall be the Contractor's sole and exclusive remedy for delay.

§ 8.3.4 Extension of Contract Time resulting from Changes in the Work shall be negotiated into respective Change Orders. Whenever the Contractor seeks an adjustment in the Contract Time as part of a Claim or Change Order, the

Init.
/
AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

Contractor shall justify the request with proper written reference to the approved construction schedules. All executed Change Orders shall be deemed to include adjustments in the Contract Time, if any, resulting from the underlying Change in the Work.

§ 8.3.5 In addition to liquidated damages set forth elsewhere in the Contract Documents, if any, the Contractor shall reimburse the Owner for all Architect's fees for additional services necessitated by (1) Contractor's failure to achieve Substantial Completion within the time established in the Contract Documents; and (2) for more than one inspection for Substantial Completion; and (3) for more than one inspection for Final Completion.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to all of the Subcontractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

The Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various Subcontracts in such form and supported by such data to substantiate its accuracy as the Architect may require. Each section of the schedule organized by Subcontract shall further allocate each Subcontractor's Work into discrete tasks with values corresponding to each task. The total of all values for all tasks for all Subcontractors shall equal the Contract Sum. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Approval by the Owner of the schedule of values (and revisions thereto) shall be a condition precedent to certification of Contractor's applications for payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 The Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents. The Contractor's inclusion in an Application for Payment of an amount owed to a Subcontractor shall constitute the Contractor's certification to the Owner that such Subcontractor is entitled to payment in that amount, and that there are no backcharges, Claims or other disputes then pending or anticipated which may impact that Subcontractor's right to such payment. Contractor shall submit all Applications for Payment in a consistent format.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not approve payment to a Subcontractor or material supplier, unless such Work has been performed by others for whom the Contractor approves payment.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 9.3.4 All Applications for Payment shall be accompanied by lien waivers from the Contractor and applicable Subcontractors. The lien waivers, when taken together, shall equal the sum due and paid under the immediately preceding Application for Payment, and shall be effective through the submittal date of the immediately preceding Application.

§ 9.3.5 All Applications for Payment shall be accompanied by the Contractor's and Subcontractors' certified payrolls as required by the Illinois Prevailing Wage Act, 820 ILCS 130/5.

§ 9.3.6 Submission of properly executed lien waivers and the certified payrolls shall be conditions precedent to certification of the respective Application for Payment.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made, or if any other condition precedent to payment has not occurred. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a separate contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§9.5.4 If at any time there is evidence of any liens or claims for which, if established, the Owner may become liable for and which would be chargeable to the Contractor or any Subcontractor, the Owner shall have the right to retain, out of any payment due or thereafter to become due to Contractor or a Subcontractor, an amount sufficient to completely indemnify the Owner against such lien or claim, including any reasonable attorneys fees that have been or may be incurred by the Owner. Should any such evidence be established after all payments are made, the Contractor or Subcontractor shall repay the Owner all sums which the Owner may be compelled to pay in discharging such lien or claim, including all reasonably attorneys fees and other costs resulting from such lien or claim.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

(Paragraph deleted)

§ 9.6.8 The Owner shall withhold ten percent (10%) from the periodic Progress Payments to the Contractor as retention. Payment of retention shall be requested with the Contractor's application for Final Payment. No interest shall accrue on monies held in retention. Contractor shall ensure that each contract between Contractor and each Subcontractor contains this same provision for the withholding and release of retention.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Subcontractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

its intended use. The Work will not be considered suitable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and posted, designated instruction of the Owner's personnel in the operation of systems has been completed and documented, and all final finishes within the Contract are in place. In general, the only remaining Work shall be minor in nature, so that the Owner can occupy the Project on that date and the completion of the Work by the Contractor will not materially interfere or hamper the Owner's normal business operations and/or use and enjoyment of the Project. As a further condition of Substantial Completion acceptance, the Contractor shall certify that all remaining Work will be completed within thirty calendar days following the Date of Substantial Completion. The Contractor shall secure and deliver to the Owner written warranties and guarantees from all Subcontractors, Sub-Subcontractors and suppliers bearing the date of Substantial Completion or some other date as may be agreed to by the Owner and stating the period of warranty as required by the Contract Documents. The Contractor is responsible for the warranty of all Work performed by Subcontractors at any tier. If in the event Contractor does not complete remaining work within forty five (45) days of Substantial completion, Owner shall give the Contractor written notice of the remaining Work to be completed. If the Contractor fails to complete the remaining work to be completed within seven (7) days of receipt of the written notice, the Owner reserves the right to complete the remaining Work in accordance with § 2.4 without further notice to the Contractor. All costs incurred by Owner therein shall be offset against Contractor's final payment.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment (the "Punch List"). Failure to include an item on the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's Punch List, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's Punch List, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof, as provided in the Contract Documents. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 Upon Substantial Completion, the Contractor and Subcontractors hereby assign all vendor and manufacturers' warranties to the Owner. All such warranties shall be submitted to the Architect prior to submission of the final Application for Payment.

§ 9.8.7 The Contractor's submittal of the following documents shall be a condition precedent to a determination of Substantial Completion:

a. All Record Documents
b. All Operations and Maintenance Manuals (3 copies in 3-ring binders)
c. All Manufacturers' warranties

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 9.8.8 LIQUIDATED DAMAGES. The parties agree that time is of the essence of this Agreement. If the Contractor fails to achieve Substantial Completion of the Work by the Substantial Completion date(s) established in the Contract Documents and/or as established in the approved construction schedules, as may be adjusted by extensions of time contained in fully-executed Change Orders, if any (the "Scheduled Date(s) of Substantial Completion"), the Contractor shall be liable to and shall pay the Owner an amount of liquidated delay damages per calendar day for each and every such day between the Scheduled Date(s) of Substantial Completion and the actual date(s) of Substantial Completion, and the Owner may set off and deduct such amounts from payments due, or which may later become due, to the Contractor. At the Owner's option, the amount of liquidated delay damages applicable to this Section may be established elsewhere in the Contract Documents.

The parties stipulate and agree that this provision is fair and reasonable, and the per day rate established in the Contract Documents is fair and reasonable, considering the nature of the harm that may be incurred by the Owner as a result of such delay, and the difficulty or impossibility of ascertaining, calculating, and/or proving the actual damages resulting from such delay. The parties stipulate and agree that this Section 9.8.8 is a valid and enforceable liquidated delay damages clause, and is not a penalty. The liquidated damages clause contained in the Contract Documents shall be Owner's sole and exclusive remedy against Contractor for delay.

If the Contract Documents do not establish liquidated delay damages, or if the liquidated delay damages clause contained in this Section 9.8.8 is determined to be unenforceable in whole or in part, by any court or tribunal of competent jurisdiction, the parties agree that the mutual waiver of consequential damages in Section 15.1.6 shall be null and void.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 All Work depicted on the Contractor's Punch List and thereafter identified in the Architect's inspection shall be completed by Contractor within thirty days of issuance of the Certificate of Substantial Completion. Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted, less retention. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

(Paragraphs deleted)
§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and specifically identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. Neither the Owner nor the Architect shall be responsible for any safety precautions or programs in connection with the Work.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume. By Change Order, the Contract Time shall be extended appropriately.

(Paragraph deleted)
§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES
In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor and each Subcontractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's and Subcontractor's operations and completed operations under the Contract and for which the Contractor or Subcontractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's or Subcontractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until three (3) years after the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents, whichever is greatest.

§ 11.1.3 Certificates of insurance and policy endorsements as required below shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor or applicable Subcontractor with reasonable promptness.

§ 11.1.4 The Contractor and each Subcontractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the "The Board of Trustees of McHenry County College," the Architect and the Architect' s Consultants as additional insureds for claims caused in whole or in part by the Contractor's or Subcontractor's negligent acts or omissions during the Contractor's or Subcontractor's operations; and (2) the "The Board of Trustees of McHenry County College" as an additional insured for claims caused in whole or in part by the Contractor's or Subcontractor's negligent acts or omissions during the Contractor's or Subcontractor's completed operations. The applicable policies shall be endorsed to indicate that they are primary as respects the additional insureds, and not contributory with any other insurance available to the additional insureds.

§ 11.1.5 Unless modified in writing by the Owner, Contractor and each Subcontractor shall maintain, at its own expense, the following insurance coverages on an occurrence basis insuring the Contractor or Subcontractor as applicable, its employees and agents, and the Indemnitees as required in Section 3.18, which insurance shall be provided by insurance companies rated at least A / XIV by Best's Key Rating Guide and shall incorporate a provision requiring the giving of written notice to Owner at least thirty (30) days prior to the cancellation, non-renewal, or material modification of any such policies.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 11.1.6.1 Contractor and the Subcontractors shall not commence Work under this Contract until all insurance required below is obtained and approved by the Owner:

§ 11.1.6.2 Commercial General Liability Insurance (including limited form contractual liability and completed operations, explosion, collapse and underground hazards), covering personal injury, bodily injury and property damage in the amount of One Million Dollars ($1,000,000) per occurrence and Two Million Dollars ($2,000,000) aggregate.

§ 11.1.6.3 Automobile Liability Insurance, including hired and non-owed vehicles, if any, in the amount of One Million Dollars ($1,000,000) covering personal injury, bodily injury and property damage.

§11.1.6.4 Workmen's Compensation Insurance in the amount of the statutory minimum with an Employer's Liability coverage of at least Five Hundred Thousand Dollars ($500,000).

§ 11.1.6.5 Umbrella / excess insurance coverage with a limit of at least Two Million Dollars ($2,000,000).

§ 11.1.6.6 Failure of either the Architect or Owner to demand certificates of insurance and/or policies and/or endorsements shall not constitute a waiver of the Contractor's and Subcontractor's responsibilities under this Article 11. Nor shall review and/or approval by either the Owner or Architect in any way relieve Contractor or any Subcontractor of its responsibility for furnishing sufficient insurance. The endorsements or amendatory riders shall indicate that as respects said additional insureds, there shall be severability of interests under the policies.

§11.1.6.7 Under no circumstance shall Contractor be relieved of providing insurance as required by this Article 11. If inspection of certificates, endorsements, or policies by Owner would reasonably reveal any deficiencies in coverage as required, Contractor shall not be relieved of its obligation to provide insurance coverages as required herein and may not assert any defense of waiver, acquiescence, estoppel, or otherwise by the failure of Owner or its agents to object to the form of the certificate, endorsements, or policies, or other documents provided by the Contractor.

§11.1.7 Contractor shall also protect the Owner by specifically incorporating this Article 11 into every Subcontract entered into and also requiring that every Subcontractor incorporate this Article and its coverage requirements into every sub-subcontract it enters into. Notwithstanding this requirement, this Article 11 is deemed incorporated into every Subcontract and sub-subcontract via such document's flow-through provisions.

§ 11.1.8 Liability of Contractor or Subcontractor is not limited by these insurance requirements or by actual insurance coverage. Nothing contained in the insurance requirements of the Contract Documents is to be construed as limiting the liability of the Contractor, the liability of any Subcontractor of any tier, or the liability of the Architect, or any of their respective insurance carriers. Owner does not, in any way, represent that the coverages or limits of insurance specified are sufficient or adequate to protect the Owner, Contractor, Architect, or any Subcontractor's interest or liabilities, but are merely minimums. The obligation of the Contractor and every Subcontractor of any tier to purchase insurance shall not, in any way, limit their obligations to the Owner in the event that the Owner should suffer an injury or loss in excess of the amount recoverable through insurance, or any loss or portion of the loss which is not covered by either the Architect's, Contractor's or any Subcontractor's insurance.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Owner, Architect's and Contractor's services and expenses required as a result of such insured loss.

(Paragraph deleted)

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance if required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused.

(Paragraphs deleted)

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

Owner and Contractor each reserve their respective rights of subrogation.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay the Owner and/or Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

(Paragraph deleted)

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor as principal shall furnish to the Owner as obligee bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. The payment and performance bonds shall

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

strictly comply with the Public Construction Bond Act, 30 ILCS 550/0.01, *et seq.*, and with all provisions of this Article 11.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.4.2.1 Prior to commencing Work, Contractor shall furnish a performance bond and a payment bond to the Owner as obligee with a penal sum equal to the Contract Sum including accepted alternates, and if the Contractor is a Construction Manager at-risk who took assignment of trade contracts pursuant to Section 5.1.1, the penal sum of such bonds shall equal the sum of all Subcontractors' bids, including accepted alternates. The surety for the performance and payment bonds shall be rated not less than A / VI by Best's Insurance Guide Key.

§ 11.4.3 If at any time the Owner shall become reasonably dissatisfied with any surety, or for any other reason such bonds shall cease to be adequate security for the Owner, Contractor shall, within five (5) days after notice to do so, substitute acceptable bonds in such form and sum and signed by such other surety or sureties as may be reasonably satisfactory to the Owner. No further payment shall be deemed due nor shall be made to Contractor until the new surety or sureties shall have met the Owner's qualifications.

§ 11.4.4 All performance and payment bonds required by this Article 11 shall be executed in conformity with American Institute of Architects Document A311, or such other form as is acceptable to the Owner. Said bond forms shall be deemed modified to the extent to be consistent with this Article 11. A certified copy of the power of attorney from the surety company stating that the person executing the bond is duly authorized by the surety to execute the bond shall be attached to the bond.

§ 11.4.5 Whenever the Contractor shall be and is declared by the Owner to be in default under the Construction Contract, the surety shall be responsible to compensate the Owner for the following costs incurred by the Owner as they result of the default: 1) any and all extra work and/or corrective work, 2) additional Architect costs, 3) accounting costs, 4) legal costs and reasonable attorneys' fees, 5) testing, consulting, and other engineering costs, 6) any other costs necessarily incurred and resulting from the default. Notwithstanding, the surety's obligations shall not exceed the penal sum of the bond.

§ 11.4.6 All terms and conditions of all Contract Documents, including these A201 general conditions, as amended, shall be deemed incorporated by reference into each bond furnished in connection with this Article 11. In case of any conflict between any provision of any performance or payment bond and the Contract Documents, the provisions of the Contract Documents shall prevail to the extent of such conflict.

§ 11.4.7 Any provision of any bond purporting to create a condition precedent for Owner not otherwise contained in the Contract Documents, or which otherwise purports to abrogate or nullify the Owner's rights or remedies otherwise available in contract, law, or equity, is void. If any provision of any bond purports to shorten the period of limitations and/or the period of repose as provided in Section 13-214 of the Code of Civil Procedure, 735 ILCS 5/13-214, or if any provision of any bond purports to shorten any other applicable statute of limitation or repose, such provision of such bond shall be stricken from such bond prior to execution, and if not stricken shall be deemed null and void, but all other provisions of such bond shall remain enforceable.

§ 11.4.8 In the event any surety shall make any assignment for the benefit of creditors or commit any act of bankruptcy, or is declared bankrupt, or if it shall file a voluntary petition in bankruptcy, or shall in the opinion of the Owner be insolvent, the Contractor shall immediately upon request by the Owner furnish and maintain other bonds satisfactory to the Owner.

§ 11.4.9 No surety shall assert solvency of its principal or its principal's denial of default as a defense to any claim under any bond furnished in accordance with this Article 11.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Owner's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Owner or Architect, be

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

uncovered for the Owner's or Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Owner or Architect has not specifically requested to examine prior to its being covered, the Owner or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor an express, written acceptance of such specific condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall be extended on specific items of Work identified as defective, and such extension shall commence upon the performance of corrective Work by the Contractor pursuant to this Section 12.2. Such extension shall expire one year from the date of completion of such corrective Work.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to any obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the Owner may seek to enforce that obligation or any other obligation arising under the Contract Documents.

§ 12.2.6 All other warranties and guarantees required by the Contract Documents shall be provided to the Architect prior to Substantial Completion, and are separate obligations from the obligations contained in this Section 12.2.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so by express written notice to the Contractor instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the State of Illinois without regard for conflict of law principles.

§ 13.1.1 Contractor and each Subcontractor shall comply with the Illinois Human Rights Act, 775 ILCS 5/2-101 *et seq*., and Contractor and each Subcontractor hereby certifies that he / she / it has and will maintain at all times during the term of this agreement a written sexual harassment policy in accordance with 775 ILCS 5/2-105(A)(4).

§ 13.1.2 Contractor and each Subcontractor hereby certifies pursuant to Section 33E-11 of the Illinois Criminal Code that he / she / it is not barred from bidding on, or contracting in connection with, the Project as a result of a conviction for either bid-rigging or bid rotating under Section 33E-3 or 33E-4 of the Criminal Code.

§ 13.1.3 The Contractor and each Subcontractor hereby certifies that he / she / it will provide a drug free workplace in compliance Section 3 of the Drug Free Workplace Act, 30 ILCS 580/3.

§ 13.1.4 At least once per month, the Contractor and each Subcontractor shall submit to the Owner certified payrolls in accordance with Section 5 of the Illinois Prevailing Wage Act, 820 ILCS 130/5.

§ 13.1.4.1 Upon the Owner's request, any employee of the Contractor or any employee of any Subcontractor or vendor shall submit state-issued identification documents (e.g. driver's license, state identification card, etc.) or other documents to the Owner so that the Owner may obtain a criminal background check of the employee. No person who fails or refuses to produce such documents may work on the Project at the Project site. Alternatively, the Owner reserves the right to direct the Contractor, at any time during the Project, to immediately obtain criminal background checks of Contractor's or Subcontractor's employees to ascertain whether such employees have been convicted of any offenses. Such criminal background checks will be performed at Contractor's or Subcontractor's expense and at no additional cost to Owner. If in the Owner's sole discretion objectionable information regarding any employee is discovered in the background check, whether performed by Owner or Contractor, such person shall not be allowed to work on the Project at the Project site. The Owner may request new background checks of any employee at any time.

§ 13.1.5 This contract is subject to and shall be construed in accordance with all provisions of law applicable to the Work and the Project. All applicable rules of law shall prevail over any conflicting provision contained in any of the Contract Documents.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Contractor shall not assign the Contract in whole or in part without written consent of the Owner.

(Paragraph deleted)

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear, without markup, costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest only in accordance with the Local Government Prompt Payment Act, 50 ILCS 505/1, *et seq.*

(Paragraphs deleted)

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

(Paragraphs deleted)

§ 14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work properly executed in conformance with the Contract Documents as of the date of termination.

§ 14.1.4 If the Work is stopped for a period of 90 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

(Paragraphs deleted)

§ 14.2.1 The Owner may upon notice to the Contractor terminate its contract with the Contractor or cause the Contractor to terminate any Subcontract with any Subcontractor if:

.1 the Contractor or that Subcontractor fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work;

.2 the Contractor or that Subcontractor institutes proceedings or consents to proceedings requesting relief under the Federal Bankruptcy Act or any similar federal or state law, or if a petition under any federal or state bankruptcy or insolvency law is filed against the Contractor or that Subcontractor and such petition is not dismissed within sixty (60) days from the date of filing, or if the Contractor or that Subcontractor admits in writing its inability to pay its debts generally as they become due, or makes a general assignment for the benefit of creditors, or if a receiver, liquidator, trustee or assignee is appointed on account of such bankruptcy or insolvency;

.3 the Contractor or that Subcontractor abandons the Work;

.4 the Contractor or that Subcontractor submits an Application for Payment, sworn statement, waiver of lien, certified payroll, affidavit or other document of any nature whatsoever which is intentionally falsified or which the Contractor or that Subcontractor knows to contain a false statement;

.5 a mechanic's or materialman's lien or notice of lien or claim of lien is filed against any part of the Work, the public funds allocated for the Work, or on the site of the Project, if after written demand by the Owner such lien is not promptly released or satisfied; or

.6 the Contractor or that Subcontractor disregards any laws, statutes, ordinances, rules, regulations or orders of a governmental body or public or quasi-public authority having jurisdiction of the Work or the site of the Project.

The termination rights under this Subparagraph 14.2.1 shall be in addition to and not in limitation of any rights or remedies, contractual, statutory or otherwise.

§ 14.2.4 In the event of termination pursuant to Section 14.2, the Contract Sum shall be reduced by Change Order to reflect any increased costs to the Owner of completing the Work, and if the unpaid balance of the Contract Sum exceeds all costs to the Owner of completing the Work, the Contractor shall pay the difference to the Owner upon written demand by the Owner. Such costs shall include but not be limited to the cost of any additional architectural, managerial and administrative services required thereby, any costs incurred in retaining another Contractor or other Subcontractors, any additional interest or fees which the Owner must pay by reason of a delay in completing of the Work, reasonable attorneys' fees and expenses, and any other damages, costs and expenses the Owner may incur by reason of completing the Work or any delay thereof. The amount, if any, to be paid to the Contractor shall be certified by the Architect, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause and in its sole discretion, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 To the extent not due to the fault of Contractor, the Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work properly executed in conformance with the Contract Documents.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by the Contractor seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The responsibility to substantiate Claims shall rest with the Contractor.

§ 15.1.2 NOTICE OF CLAIMS

Claims by the Contractor must be initiated by written notice to the Owner and to the Initial Decision Maker, if any, with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. For Claims for Additional Time, to the extent that an equitable extension of Time is warranted, such extension shall be the Contractor's sole and exclusive remedy.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.5.3 For all Claims for Additional Time, the Contractor shall support such Claims in the same manner as supporting additional time for Change Orders.

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 delay damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit.

This mutual waiver is applicable, without limitation, to all consequential delay damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims by the Contractor ("Claims"), excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to arbitration or litigation, as the case may be, of any Claim initiated by Contractor and arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall not be binding.

(Paragraphs deleted)

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

(Paragraphs deleted)

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 15.4 ARBITRATION

§ 15.4.1 In the sole and exclusive discretion of the Owner, all claims, disputes and other matters in question between any of the Architect, Owner, Contractor, Surety, Subcontractor or any material supplier arising out of, or relating to, agreements to which two or more of said parties are bound, or the Contract Documents or the breach thereof, shall, in the case of such election by the Owner, be decided by arbitration. If the Owner elects such arbitration, it shall be conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect at the time that the demand is made, as modified herein. In any such arbitration, the arbitrator shall make separate findings as to liability and the amount of damages with respect to each party to the arbitration to the extent any liability or responsibility for damages exists. The Architect, surety, subcontractors and material suppliers who have an interest in the dispute shall be joined as parties to the arbitration. The arbitrator shall have authority to decide all issues between the parties. The foregoing option of the Owner to arbitrate shall be specifically enforceable by the Owner under the prevailing arbitration law. The award rendered by the arbitrator shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.1.1 If the Owner elects arbitration, in its sole discretion, notice of the demand for arbitration shall be filed in writing with the other part(ies) to the arbitration and with the American Arbitration Association. Such demand for arbitration shall be made within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would otherwise be barred by an applicable statute of limitations or repose. Whether such limitations have been met shall be decided by the arbitrator if contested by a party.

§ 15.4.1.2 All parties shall carry on the Work and perform their duties during any arbitration proceedings, and the Owner shall continue to make payments to the extent required by the Contract Documents. However, at the request of any party, contested payments may be placed in an escrow account pending resolution of the dispute.

§ 15.4.1.3 If the Owner elects arbitration, in its sole discretion, in addition to the other rules of the American Arbitration Association applicable to any arbitration hereunder, the following shall apply:

.1 Promptly after the empaneling of the arbitrator, the arbitrator shall establish a procedure for each party to set forth in writing and to serve upon each other party a detailed statement of its contentions of fact and law, along with appropriate responses thereto;

.2 All parties to the arbitration shall be entitled to reasonable discovery procedures as provided by the Illinois Code of Civil Procedure and Illinois Supreme Court Rules, as supplemented by rules to be established by the arbitrator;

.3 The arbitration shall be commenced and conducted as expeditiously as possible consistent with affording reasonable discovery as provided herein. Similarly, the scope of discovery, and the extent of proceedings hereunder relating to discovery, shall be consistent with the parties' intent that the arbitration be conducted as expeditiously as possible.

§ 15.4.2 In the event of any litigation or arbitration between the parties hereunder, the Contractor shall pay the Owner's reasonable attorneys' fees and court costs to the extent the court or tribunal determines the Owner is the prevailing party.

737066v1
(Paragraphs deleted)

AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

Additions and Deletions Report for
AIA® Document A201™ – 2007

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 14:58:53 on 02/06/2018.

PAGE 1

Greenhouse Project

...

The Board of Trustees of McHenry County College
8900 US Highway 14
Crystal Lake, Illinois 60012

...

Demonica Kemper Architects
125 N. Halsted Street, Suite 301
Chicago, IL 60661

PAGE 9

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents included in the Project Manual, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, ~~(2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.~~or (2) a Change Order.

...

The term "Work" means all of the Contractor's duties under the Contract Documents, including the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

...

§ 1.1.8 ~~INITIAL DECISION MAKER~~INITIAL DECISION MAKER

The Initial Decision ~~Maker~~ Maker, if any, is the person identified in the Agreement to render initial decisions on Claims in accordance with Section ~~15.2 and certify termination of the Agreement under Section 14.2.2.~~ 15.2.

PAGE 10

§1.2.4 If any two or more provisions of the Contract Documents conflict, and such conflict relates to the quantity or quality of the Work, the Contractor agrees to provide the greater quantity and/or better quality of such Work.

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

...

§ 1.5

~~OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE~~OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The ~~Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The~~ Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the ~~Architect's or Architect's consultants'~~ Owner's reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the ~~Owner, Architect and the Architect's consultants.~~ Owner.

~~§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM~~

~~If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.~~

...

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who ~~shall~~ shall, to the extent allowed by law and by the Owner's Board Policies, have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

~~§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.~~

~~§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER~~

~~§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. The Contractor shall provide information or other assistance as the Architect or Owner may request in connection with these obligations.

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. The Owner's rights and remedies under this section are in addition to, and not a limitation of, any other rights and remedies of the Owner under the Contract Documents or otherwise.

...

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or approved construction schedules, and fails within a ~~ten-day~~ five-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and reasonable attorneys' fees, and compensation for the Architect's additional services made necessary by such default, neglect or failure. ~~Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect.~~ If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner within thirty (30) days after a request by the Owner.

§2.5 OWNER'S RIGHT TO AUDIT. The Contractor shall keep full and accurate records of all labor and material costs incurred and items billed in connection with the performance of the Work, which records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until three years after Final Payment. In addition, the Contractor shall make it a condition of all Subcontracts relating to the Work that all Subcontractors will keep accurate records of costs incurred and items billed in connection with their work and that such records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until three years after Subcontractor's final completion.

...

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative. The Contractor is an independent contractor, and shall not be deemed an agent of the Owner for any reason.

§ 3.1.2 The Contractor shall perform the Work in strict accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in strict accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

...

§ 3.2.1 ~~Execution of the Contract by the Contractor is a representation that the Contractor has visited the~~ The Contractor represents that it has visited the Project site, become generally familiar with local conditions under which the Work is to be ~~performed and correlated personal observations with requirements of~~ performed, correlated personal observations with requirements of the Contract Documents, and has satisfied itself as to the nature and location of the Work, the general and local conditions, including those bearing upon access (including partial or total restrictions on access), transportation, delivery, disposal, staging, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical conditions of the ground, the character, quality and quantity of existing conditions to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the Work and all other matters which can in any way effect the Work or

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

the cost thereof under this Agreement. Any failure by the Contractor to acquaint itself with all the available information concerning these conditions will not relieve the Contractor from any obligation under the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering latent errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any apparent errors, inconsistencies or omissions ~~discovered by or made known to the Contractor~~ as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

PAGE 12

§ 3.2.5 In all cases where Work interconnects with existing facilities, Contractor shall field measure and verify at the site all dimensions relating to such existing facilities. Any conflicts in the Work and the existing facilities which could have been mitigated by the Contractor's obligation to verify the dimensions of the existing facilities shall be promptly rectified by the Contractor at its own expense.

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. ~~If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.~~

...

§ 3.3.4 The Contractor shall coordinate inspections by governmental authorities having jurisdiction over the Work.

§ 3.3.5 No inspection performed or failed to be performed by the Owner or Architect shall be a wavier of any of the Contractor's obligations hereunder.

PAGE 13

§ 3.4.4 The Contractor shall not at any time permit on the Project site any alcohol or controlled substances whether inside or outside of buildings or structures. Possession or use of any of the foregoing at or adjacent to the site shall obligate the Contractor to remove such offending personnel from the site and replace them at no additional cost to the Owner.

§3.4.5 The Contractor and any Subcontractors shall conform to labor laws of the State and various acts amendatory and supplementary thereto and to other laws, ordinances and legal requirements applicable thereto. Contractor shall enforce among all personnel directly or indirectly employed by it, and among all Subcontractors and their employees, all rules which the Owner may establish for conduct of such personnel on the site.

§3.4.6 The Contractor shall pay prevailing wages in accordance with and shall fully comply with all requirements of the Prevailing Wage Act, 820 ILCS 130/0.01, *et seq.*

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work ~~will~~ shall strictly conform to the requirements of the Contract Documents and ~~will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit.~~ shall be free from defects. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

...

The Owner is tax-exempt. Notwithstanding, the Contractor shall pay any applicable sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are ~~received or negotiations concluded,~~ received, whether or not yet effective or merely scheduled to go into effect.

§ 3.7
~~PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS~~PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

...

§ 3.7.3 If the Contractor performs Work ~~knowing it to be~~ contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.
PAGE 14

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall immediately notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

...

.1 ~~Allowances~~ allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

...

.3 ~~Whenever~~ whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

...

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the ~~Work.~~ Work on site. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The superintendent shall be subject to approval by the Owner and shall not be replaced without the prior written consent of the Owner. The Owner shall have the right to require that the Contractor replace the superintendent, at no additional cost to the Owner, at any time during the duration of the Work if his/her performance is not satisfactory to the Owner.

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner ~~through the Architect~~ the name and qualifications of a proposed superintendent. The ~~Architect~~ Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the ~~Architect~~ Owner requires additional time to review. Failure of the ~~Architect~~ Owner to reply within the 14 day period shall constitute notice ~~of no reasonable objection.~~ that Owner has no initial objection to the proposed superintendent, but shall not affect Owner's right to make a subsequent rejection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner ~~or Architect~~ has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's ~~consent, which shall not unreasonably be withheld or delayed.~~ consent..

PAGE 15

§ 3.10.1.1 The Contractor's construction schedules shall be in a bar chart format, and shall depict, at a minimum, activity identification and durations, critical path, float, early start, early finish, late start, and late finish.

§ 3.10.1.1.1 The float in the construction schedules will not be deemed exclusively available to the Contractor or Owner, but rather shall be available to either party as needed.

§ 3.10.1.2 No less than once per month, the Contractor shall submit an updated construction schedule. The updated construction schedule shall depict actual start and completion dates for Work commenced and, if appropriate, Work completed. Additionally, the updated construction schedules shall depict updated estimates of anticipated commencement and completion dates for all upcoming Work.

§ 3.10.1.3 Submission of the initial construction schedule and monthly schedule updates shall be absolute prerequisites of certification of the Contractor's application for payment.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect. If the Contractor fails to adhere to the approved construction schedule(s), Contractor shall immediately, at its own expense, take necessary measures to remedy such failure, including addition of personnel and/or equipment, overtime, and/or additional shifts. The Owner shall be entitled to rely on Contractor's schedules for coordination of its own activities, as well as the activities of other contractors working at the Project site or on the Project.

...

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required ~~submittals.~~ submittals (collectively the "Record Documents"). These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1 The Contractor shall make the Record Documents available for inspection by the Architect upon reasonable notice. Adequate maintenance of the Record Documents shall be a prerequisite to certification of the Contractor's applications for payment.

PAGE 16

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. The Contractor shall submit Product Data for all equipment and materials incorporated into the finished Work. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

...

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the ~~Owner and the~~ Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the ~~Owner and Architect have~~ Architect has specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

PAGE 17

The Contractor shall confine operations at the site to the site access plan, if any, and to the areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

...

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. Throughout the progress of the Work the Contractor shall continually remove from the Project Site and from any adjacent property, all waste, scraps, tools, equipment, storage facilities, machinery, trailers, and vehicles no longer required for prosecution of the Work, such that the Project site remains clean, orderly, and safe.

...

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, ~~provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself),~~ but only to the extent caused by the Contractor's or any Subcontractor's breach of the Contract Documents, or by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be ~~liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.~~ liable. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity ~~that~~ which would otherwise exist as to a party or person described in this Section 3.18.

PAGE 18

~~**§ 4.1.2** Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.~~

~~**§ 4.1.3** If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.~~

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate ~~for~~ For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

...

§ 4.2.6 The Architect ~~has~~ and the Owner each have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

PAGE 19

~~§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.~~

§ 4.2.12 Interpretations ~~and decisions~~ of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. ~~When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.~~

...

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. All requests for information shall be submitted to the Architect in a format acceptable to the Architect.

...

§ 5.1.1 ~~A~~ If this Project is utilizing a construction manager at-risk, the construction manager at-risk shall be the "Contractor" referenced in these general conditions, and when the lowest, responsive and responsible multiple prime trade contractor(s) are identified and awarded contracts by the Owner, each such award shall constitute the automatic assignment of that trade contract by the Owner to the Contractor, and each such successful bidder shall then be known as a "Subcontractor." If this Project is utilizing a single general contractor or multiple prime trade contractors, and the Project is not utilizing a construction manager-at risk, then there shall be no such assignment. In any case, a Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

...

~~§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK~~

~~§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.~~

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

~~§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.~~

~~§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.~~

~~§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.~~

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect.

Each Subcontractor acknowledges: (1) that the Owner is a direct intended third party beneficiary of each Subcontract between the Contractor and Subcontractor; (2) that notwithstanding any contract provision to the contrary, Subcontractor shall be bound to perform the Work in accordance with these AIA A201 general conditions, as amended; and (3) that the Subcontractor is not a third party beneficiary of the construction management contract between Contractor and Owner.

PAGE 20

.1 assignment is effective only after termination of the Contract by the Owner ~~for cause pursuant to Section 14.2~~ and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

...

~~§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.~~

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. ~~If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.~~

...

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the ~~site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation.~~ site. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

...

~~§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations~~

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

~~and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.~~

PAGE 21

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The ~~Owner~~ separate contractors shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction. For the purposes of facilitating this section only, the Contractor and separate contractors shall be deemed intended third party beneficiaries to each others' respective contracts with the Owner.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the ~~Owner or~~ Owner, separate contractors as provided in Section 10.2.5.

...

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and ~~the Architect will~~ allocate the cost among those responsible.

...

§ 7.1.1 The Owner may, without invalidating the Contract and without notice to the surety, direct changes in the Work. Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

...

§ 7.1.4 No Change Order shall be approved or paid unless preceded by written direction for Change is provided by the Owner. This requirement cannot be waived. There shall be no implicit or constructive change orders.

...

§ 7.2.2 No payment for changes in the Work shall be made until such change has been memorialized in an executed Change Order and the Change has been executed.

§ 7.2.3 The Contractor shall be permitted the following markups for additive changes orders, and shall be required to take the following mark-downs for deductive change orders. Additional markup for insurance or bonds will not be allowed. All change order requests must be submitted with the following backup information or they will not be reviewed by the Architect or Owner: material and labor quantities, material unit costs, labor rates, and any other substantiating data to explain the change order amount.

Markups and Markdowns for Change Orders:

Additive Change Order: 10%
Deductive Change Order: 10%

PAGE 22

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change ~~Order.~~ Order for the purposes of defining the change and/or how payment shall be calculated, but not for the purpose of approving payment.

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

...

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated ~~are materially changed~~ change by more than 25% in a proposed Change Order or Construction Change ~~Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor,~~ Directive, the applicable unit prices shall be equitably adjusted.

...

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. ~~Such~~ Upon execution by the Owner, such agreement shall be effective ~~immediately~~ and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit ~~as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In~~ (as provided in §7.2.3). In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

PAGE 23

~~§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.~~

...

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. Unless provided elsewhere in the Contract Documents, the Contractor shall achieve Final Completion within thirty (30) days following Substantial Completion.

...

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and ~~arbitration; or by other causes that the Architect determines may justify delay,~~ arbitration, then the Contract Time shall be extended by Change Order for such reasonable time as the ~~Architect~~ Owner may determine.

...

§ 8.3.3 ~~This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.~~ Extension of Contract Time pursuant to this Article 8 shall be the Contractor's sole and exclusive remedy for delay.

§ 8.3.4 Extension of Contract Time resulting from Changes in the Work shall be negotiated into respective Change Orders. Whenever the Contractor seeks an adjustment in the Contract Time as part of a Claim or Change Order, the Contractor shall justify the request with proper written reference to the approved construction schedules. All executed

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

Change Orders shall be deemed to include adjustments in the Contract Time, if any, resulting from the underlying Change in the Work.

§ 8.3.5 In addition to liquidated damages set forth elsewhere in the Contract Documents, if any, the Contractor shall reimburse the Owner for all Architect's fees for additional services necessitated by (1) Contractor's failure to achieve Substantial Completion within the time established in the Contract Documents; and (2) for more than one inspection for Substantial Completion; and (3) for more than one inspection for Final Completion.

PAGE 24

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to ~~the Contractor~~ all of the Subcontractor for performance of the Work under the Contract Documents.

...

~~Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the~~ The Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various ~~portions of the Work and prepared~~ Subcontracts in such form and supported by such data to substantiate its accuracy as the Architect may require. Each section of the schedule organized by Subcontract shall further allocate each Subcontractor's Work into discrete tasks with values corresponding to each task. The total of all values for all tasks for all Subcontractors shall equal the Contract Sum. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Approval by the Owner of the schedule of values (and revisions thereto) shall be a condition precedent to certification of Contractor's applications for payment.

...

§ 9.3.1 ~~At least ten days before the date established for each progress payment, the~~ The Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, ~~if required under Section 9.2,~~ for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents. The Contractor's inclusion in an Application for Payment of an amount owed to a Subcontractor shall constitute the Contractor's certification to the Owner that such Subcontractor is entitled to payment in that amount, and that there are no backcharges, Claims or other disputes then pending or anticipated which may impact that Subcontractor's right to such payment. Contractor shall submit all Applications for Payment in a consistent format.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by ~~Construction Change Directives, or by interim determinations of the Architect, but not yet included in~~ Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not ~~intend to pay~~ approve payment to a Subcontractor or material supplier, unless such Work has been performed by others for whom the Contractor ~~intends to pay.~~ approves payment.

PAGE 25

§ 9.3.4 All Applications for Payment shall be accompanied by lien waivers from the Contractor and applicable Subcontractors. The lien waivers, when taken together, shall equal the sum due and paid under the immediately preceding Application for Payment, and shall be effective through the submittal date of the immediately preceding Application.

§ 9.3.5 All Applications for Payment shall be accompanied by the Contractor's and Subcontractors' certified payrolls as required by the Illinois Prevailing Wage Act, 820 ILCS 130/5.

§ 9.3.6 Submission of properly executed lien waivers and the certified payrolls shall be conditions precedent to certification of the respective Application for Payment.

...

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be ~~made.~~ made, or if any other condition precedent to payment has not occurred. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

PAGE 26

§9.5.4 If at any time there is evidence of any liens or claims for which, if established, the Owner may become liable for and which would be chargeable to the Contractor or any Subcontractor, the Owner shall have the right to retain, out of any payment due or thereafter to become due to Contractor or a Subcontractor, an amount sufficient to completely indemnify the Owner against such lien or claim, including any reasonable attorneys fees that have been or may be incurred by the Owner. Should any such evidence be established after all payments are made, the Contractor or Subcontractor shall repay the Owner all sums which the Owner may be compelled to pay in discharging such lien or claim, including all reasonably attorneys fees and other costs resulting from such lien or claim.

...

~~§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.~~

§ 9.6.8 The Owner shall withhold ten percent (10%) from the periodic Progress Payments to the Contractor as retention. Payment of retention shall be requested with the Contractor's application for Final Payment. No interest shall accrue on monies held in retention. Contractor shall ensure that each contract between Contractor and each Subcontractor contains this same provision for the withholding and release of retention.

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the ~~Contractor's~~ Subcontractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

...

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The Work will not be considered suitable for Substantial Completion review until all Project systems included in the Work are operational as designed and scheduled, all designated or required governmental inspections and certifications have been made and posted, designated instruction of the Owner's personnel in the operation of systems has been completed and documented, and all final finishes within the Contract are in place. In general, the only remaining Work shall be minor in nature, so that the Owner can occupy the Project on that date and the completion of the Work by the Contractor will not materially interfere or hamper the Owner's normal business operations and/or use and enjoyment of the Project. As a further condition of Substantial Completion acceptance, the Contractor shall certify that all remaining Work will be completed within thirty calendar days following the Date of

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

Substantial Completion. The Contractor shall secure and deliver to the Owner written warranties and guarantees from all Subcontractors, Sub-Subcontractors and suppliers bearing the date of Substantial Completion or some other date as may be agreed to by the Owner and stating the period of warranty as required by the Contract Documents. The Contractor is responsible for the warranty of all Work performed by Subcontractors at any tier. If in the event Contractor does not complete remaining work within forty five (45) days of Substantial completion, Owner shall give the Contractor written notice of the remaining Work to be completed. If the Contractor fails to complete the remaining work to be completed within seven (7) days of receipt of the written notice, the Owner reserves the right to complete the remaining Work in accordance with § 2.4 without further notice to the Contractor. All costs incurred by Owner therein shall be offset against Contractor's final payment.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final ~~payment.~~ payment (the "Punch List"). Failure to include an item on ~~such list~~ the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's ~~list,~~ Punch List, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's ~~list,~~ Punch List, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.
PAGE 27

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion ~~thereof.~~ thereof, as provided in the Contract Documents. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 Upon Substantial Completion, the Contractor and Subcontractors hereby assign all vendor and manufacturers' warranties to the Owner. All such warranties shall be submitted to the Architect prior to submission of the final Application for Payment.

§ 9.8.7 The Contractor's submittal of the following documents shall be a condition precedent to a determination of Substantial Completion:

a. All Record Documents
b. All Operations and Maintenance Manuals (3 copies in 3-ring binders)
c. All Manufacturers' warranties

§ 9.8.8 LIQUIDATED DAMAGES. The parties agree that time is of the essence of this Agreement. If the Contractor fails to achieve Substantial Completion of the Work by the Substantial Completion date(s) established in the Contract Documents and/or as established in the approved construction schedules, as may be adjusted by extensions of time contained in fully-executed Change Orders, if any (the "Scheduled Date(s) of Substantial Completion"), the Contractor shall be liable to and shall pay the Owner an amount of liquidated delay damages per calendar day for each and every such day between the Scheduled Date(s) of Substantial Completion and the actual date(s) of Substantial Completion, and the Owner may set off and deduct such amounts from payments due, or which may later become due, to the Contractor. At the Owner's option, the amount of liquidated delay damages applicable to this Section may be established elsewhere in the Contract Documents.

The parties stipulate and agree that this provision is fair and reasonable, and the per day rate established in the Contract Documents is fair and reasonable, considering the nature of the harm that may be incurred by the Owner as a result of such delay, and the difficulty or impossibility of ascertaining, calculating, and/or proving the actual damages resulting from such delay. The parties stipulate and agree that this Section 9.8.8 is a valid and enforceable liquidated delay

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

damages clause, and is not a penalty. The liquidated damages clause contained in the Contract Documents shall be Owner's sole and exclusive remedy against Contractor for delay.

If the Contract Documents do not establish liquidated delay damages, or if the liquidated delay damages clause contained in this Section 9.8.8 is determined to be unenforceable in whole or in part, by any court or tribunal of competent jurisdiction, the parties agree that the mutual waiver of consequential damages in Section 15.1.6 shall be null and void.

PAGE 28

§ 9.10.1 All Work depicted on the Contractor's Punch List and thereafter identified in the Architect's inspection shall be completed by Contractor within thirty days of issuance of the Certificate of Substantial Completion. Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If ~~a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If~~ such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and ~~accepted.~~ accepted, less retention. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

~~**§ 9.10.4** The making of final payment shall constitute a waiver of Claims by the Owner except those arising from~~

~~.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;~~

~~.2 failure of the Work to comply with the requirements of the Contract Documents; or~~

~~.3 terms of special warranties required by the Contract Documents.~~

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and specifically identified by that payee as unsettled at the time of final Application for Payment.

PAGE 29

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. Neither the Owner nor the Architect shall be responsible for any safety precautions or programs in connection with the Work.
PAGE 30

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall ~~resume upon written agreement of the Owner and Contractor.~~ resume. By Change Order, the Contract Time shall be extended ~~appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.~~ appropriately.

~~**§ 10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.~~

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the ~~site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.~~ site.
PAGE 31

§ 11.1.1 The Contractor and each Subcontractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's and Subcontractor's operations and completed operations under the Contract and for which the Contractor or Subcontractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

...

.8 Claims involving contractual liability insurance applicable to the Contractor's or Subcontractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until three (3) years after the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract ~~Documents.~~ Documents, whichever is greatest.

§ 11.1.3 Certificates of insurance ~~acceptable to the Owner~~ and policy endorsements as required below shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor or applicable Subcontractor with reasonable promptness.

§ 11.1.4 The Contractor and each Subcontractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the ~~Owner,~~ "The Board of Trustees of McHenry County College," the Architect and the Architect's ~~consultants~~ Consultants as additional insureds for claims caused in whole or in part by the Contractor's or Subcontractor's negligent acts or omissions during the Contractor's ~~operations; and (2) the Owner~~ or Subcontractor's operations; and (2) the "The Board of Trustees of McHenry County College" as an additional insured for claims caused in whole or in part by the Contractor's or Subcontractor's negligent acts or omissions during the Contractor's ~~completed operations.~~or Subcontractor's completed operations. The applicable policies shall be endorsed to indicate that they are primary as respects the additional insureds, and not contributory with any other insurance available to the additional insureds.

§11.1.5 Unless modified in writing by the Owner, Contractor and each Subcontractor shall maintain, at its own expense, the following insurance coverages on an occurrence basis insuring the Contractor or Subcontractor as applicable, its employees and agents, and the Indemnitees as required in Section 3.18, which insurance shall be provided by insurance companies rated at least A / XIV by Best's Key Rating Guide and shall incorporate a provision requiring the giving of written notice to Owner at least thirty (30) days prior to the cancellation, non-renewal, or material modification of any such policies.

§11.1.6.1 Contractor and the Subcontractors shall not commence Work under this Contract until all insurance required below is obtained and approved by the Owner:

§11.1.6.2 Commercial General Liability Insurance (including limited form contractual liability and completed operations, explosion, collapse and underground hazards), covering personal injury, bodily injury and property damage in the amount of One Million Dollars ($1,000,000) per occurrence and Two Million Dollars ($2,000,000) aggregate.

§11.1.6.3 Automobile Liability Insurance, including hired and non-owed vehicles, if any, in the amount of One Million Dollars ($1,000,000) covering personal injury, bodily injury and property damage.

§11.1.6.4 Workmen's Compensation Insurance in the amount of the statutory minimum with an Employer's Liability coverage of at least Five Hundred Thousand Dollars ($500,000).

§ 11.1.6.5 Umbrella / excess insurance coverage with a limit of at least Two Million Dollars ($2,000,000).

§ 11.1.6.6 Failure of either the Architect or Owner to demand certificates of insurance and/or policies and/or endorsements shall not constitute a waiver of the Contractor's and Subcontractor's responsibilities under this Article 11. Nor shall review and/or approval by either the Owner or Architect in any way relieve Contractor or any Subcontractor of its responsibility for furnishing sufficient insurance. The endorsements or amendatory riders shall indicate that as respects said additional insureds, there shall be severability of interests under the policies.

§11.1.6.7 Under no circumstance shall Contractor be relieved of providing insurance as required by this Article 11. If inspection of certificates, endorsements, or policies by Owner would reasonably reveal any deficiencies in coverage as required, Contractor shall not be relieved of its obligation to provide insurance coverages as required herein and may not assert any defense of waiver, acquiescence, estoppel, or otherwise by the failure of Owner or its agents to object to the form of the certificate, endorsements, or policies, or other documents provided by the Contractor.

§11.1.7 Contractor shall also protect the Owner by specifically incorporating this Article 11 into every Subcontract entered into and also requiring that every Subcontractor incorporate this Article and its coverage requirements into every sub-subcontract it enters into. Notwithstanding this requirement, this Article 11 is deemed incorporated into every Subcontract and sub-subcontract via such document's flow-through provisions.

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 11.1.8 Liability of Contractor or Subcontractor is not limited by these insurance requirements or by actual insurance coverage. Nothing contained in the insurance requirements of the Contract Documents is to be construed as limiting the liability of the Contractor, the liability of any Subcontractor of any tier, or the liability of the Architect, or any of their respective insurance carriers. Owner does not, in any way, represent that the coverages or limits of insurance specified are sufficient or adequate to protect the Owner, Contractor, Architect, or any Subcontractor's interest or liabilities, but are merely minimums. The obligation of the Contractor and every Subcontractor of any tier to purchase insurance shall not, in any way, limit their obligations to the Owner in the event that the Owner should suffer an injury or loss in excess of the amount recoverable through insurance, or any loss or portion of the loss which is not covered by either the Architect's, Contractor's or any Subcontractor's insurance.

PAGE 32

§ 11.3.1 Unless otherwise provided, the ~~Owner~~ Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Owner, Architect's and Contractor's services and expenses required as a result of such insured loss.

~~**§ 11.3.1.2** If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.~~

PAGE 33

The Owner shall purchase and maintain boiler and machinery insurance if required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

...

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. ~~The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.~~

~~**§ 11.3.4** If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.~~

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

~~§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.~~

...

~~The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.~~Owner and Contractor each reserve their respective rights of subrogation.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay the Owner and/or Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

~~**§ 11.3.9** If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.~~

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. ~~If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.~~

...

§ 11.4.1 The ~~Owner shall have the right to require the Contractor to furnish~~ Contractor as principal shall furnish to the Owner as obligee bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. The payment and performance bonds shall strictly comply with the Public Construction Bond Act, 30 ILCS 550/0.01, *et seq.*, and with all provisions of this Article 11.

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 11.4.2.1 Prior to commencing Work, Contractor shall furnish a performance bond and a payment bond to the Owner as obligee with a penal sum equal to the Contract Sum including accepted alternates, and if the Contractor is a Construction Manager at-risk who took assignment of trade contracts pursuant to Section 5.1.1, the penal sum of such bonds shall equal the sum of all Subcontractors' bids, including accepted alternates. The surety for the performance and payment bonds shall be rated not less than A / VI by Best's Insurance Guide Key.

§ 11.4.3 If at any time the Owner shall become reasonably dissatisfied with any surety, or for any other reason such bonds shall cease to be adequate security for the Owner, Contractor shall, within five (5) days after notice to do so, substitute acceptable bonds in such form and sum and signed by such other surety or sureties as may be reasonably satisfactory to the Owner. No further payment shall be deemed due nor shall be made to Contractor until the new surety or sureties shall have met the Owner's qualifications.

§ 11.4.4 All performance and payment bonds required by this Article 11 shall be executed in conformity with American Institute of Architects Document A311, or such other form as is acceptable to the Owner. Said bond forms shall be deemed modified to the extent to be consistent with this Article 11. A certified copy of the power of attorney from the surety company stating that the person executing the bond is duly authorized by the surety to execute the bond shall be attached to the bond.

§ 11.4.5 Whenever the Contractor shall be and is declared by the Owner to be in default under the Construction Contract, the surety shall be responsible to compensate the Owner for the following costs incurred by the Owner as they result of the default: 1) any and all extra work and/or corrective work, 2) additional Architect costs, 3) accounting costs, 4) legal costs and reasonable attorneys' fees, 5) testing, consulting, and other engineering costs, 6) any other costs necessarily incurred and resulting from the default. Notwithstanding, the surety's obligations shall not exceed the penal sum of the bond.

§ 11.4.6 All terms and conditions of all Contract Documents, including these A201 general conditions, as amended, shall be deemed incorporated by reference into each bond furnished in connection with this Article 11. In case of any conflict between any provision of any performance or payment bond and the Contract Documents, the provisions of the Contract Documents shall prevail to the extent of such conflict.

§ 11.4.7 Any provision of any bond purporting to create a condition precedent for Owner not otherwise contained in the Contract Documents, or which otherwise purports to abrogate or nullify the Owner's rights or remedies otherwise available in contract, law, or equity, is void. If any provision of any bond purports to shorten the period of limitations and/or the period of repose as provided in Section 13-214 of the Code of Civil Procedure, 735 ILCS 5/13-214, or if any provision of any bond purports to shorten any other applicable statute of limitation or repose, such provision of such bond shall be stricken from such bond prior to execution, and if not stricken shall be deemed null and void, but all other provisions of such bond shall remain enforceable.

§ 11.4.8 In the event any surety shall make any assignment for the benefit of creditors or commit any act of bankruptcy, or is declared bankrupt, or if it shall file a voluntary petition in bankruptcy, or shall in the opinion of the Owner be insolvent, the Contractor shall immediately upon request by the Owner furnish and maintain other bonds satisfactory to the Owner.

§ 11.4.9 No surety shall assert solvency of its principal or its principal's denial of default as a defense to any claim under any bond furnished in accordance with this Article 11.

...

§ 12.1.1 If a portion of the Work is covered contrary to the Owner's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Owner or Architect, be uncovered for the Owner's or Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Owner or Architect has not specifically requested to examine prior to its being covered, the Owner or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.
PAGE 35

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor ~~a~~ an express, written acceptance of such specific condition. The Owner shall give such notice promptly after discovery of the condition. ~~During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.~~ If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

...

§ 12.2.2.3 The one-year period for correction of Work shall ~~not be extended by corrective Work performed~~ be extended on specific items of Work identified as defective, and such extension shall commence upon the performance of corrective Work by the Contractor pursuant to this Section 12.2. Such extension shall expire one year from the date of completion of such corrective Work.

...

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to ~~other~~ any obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the ~~obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.~~ Owner may seek to enforce that obligation or any other obligation arising under the Contract Documents.

§ 12.2.6 All other warranties and guarantees required by the Contract Documents shall be provided to the Architect prior to Substantial Completion, and are separate obligations from the obligations contained in this Section 12.2.

...

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so by express written notice to the Contractor instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.
PAGE 36

The Contract shall be governed by the law of the ~~place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~ State of Illinois without regard for conflict of law principles.

§ 13.1.1 Contractor and each Subcontractor shall comply with the Illinois Human Rights Act, 775 ILCS 5/2-101 *et seq.*, and Contractor and each Subcontractor hereby certifies that he / she / it has and will maintain at all times during the term of this agreement a written sexual harassment policy in accordance with 775 ILCS 5/2-105(A)(4).

§ 13.1.2 Contractor and each Subcontractor hereby certifies pursuant to Section 33E-11 of the Illinois Criminal Code that he / she / it is not barred from bidding on, or contracting in connection with, the Project as

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

a result of a conviction for either bid-rigging or bid rotating under Section 33E-3 or 33E-4 of the Criminal Code.

§ 13.1.3 The Contractor and each Subcontractor hereby certifies that he / she / it will provide a drug free workplace in compliance Section 3 of the Drug Free Workplace Act, 30 ILCS 580/3.

§ 13.1.4 At least once per month, the Contractor and each Subcontractor shall submit to the Owner certified payrolls in accordance with Section 5 of the Illinois Prevailing Wage Act, 820 ILCS 130/5.

§ 13.1.4.1 Upon the Owner's request, any employee of the Contractor or any employee of any Subcontractor or vendor shall submit state-issued identification documents (e.g. driver's license, state identification card, etc.) or other documents to the Owner so that the Owner may obtain a criminal background check of the employee. No person who fails or refuses to produce such documents may work on the Project at the Project site. Alternatively, the Owner reserves the right to direct the Contractor, at any time during the Project, to immediately obtain criminal background checks of Contractor's or Subcontractor's employees to ascertain whether such employees have been convicted of any offenses. Such criminal background checks will be performed at Contractor's or Subcontractor's expense and at no additional cost to Owner. If in the Owner's sole discretion objectionable information regarding any employee is discovered in the background check, whether performed by Owner or Contractor, such person shall not be allowed to work on the Project at the Project site. The Owner may request new background checks of any employee at any time.

§ 13.1.5 This contract is subject to and shall be construed in accordance with all provisions of law applicable to the Work and the Project. All applicable rules of law shall prevail over any conflicting provision contained in any of the Contract Documents.

...

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. ~~Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.~~Contractor shall not assign the Contract in whole or in part without written consent of the Owner.

~~**§ 13.2.2** The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.~~

PAGE 37

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall ~~bear~~ bear, without markup, costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

...

Payments due and unpaid under the Contract Documents shall bear interest ~~from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~only in accordance with the Local Government Prompt Payment Act, 50 ILCS 505/1, *et seq.*

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

~~§ 13.7 TIME LIMITS ON CLAIMS~~

~~The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.~~

...

~~.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.~~

~~§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.~~

§ 14.1.3 If one of the reasons described in Section 14.1.1 ~~or 14.1.2~~ exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work ~~executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.~~ properly executed in conformance with the Contract Documents as of the date of termination.

§ 14.1.4 If the Work is stopped for a period of ~~60~~ 90 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

PAGE 38

~~§ 14.2.1 The Owner may terminate the Contract if the Contractor~~

~~.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;~~

~~.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;~~

~~.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or~~

~~.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.~~

~~§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:~~

~~.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;~~

~~.2 Accept assignment of subcontracts pursuant to Section 5.4; and~~

~~.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.~~

~~§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.~~

§ 14.2.1 The Owner may upon notice to the Contractor terminate its contract with the Contractor or cause the Contractor to terminate any Subcontract with any Subcontractor if:

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

.1 the Contractor or that Subcontractor fails, except in cases for which extension of time is provided, to prosecute promptly and diligently the Work or to supply enough properly skilled workmen or proper materials for the Work;

.2 the Contractor or that Subcontractor institutes proceedings or consents to proceedings requesting relief under the Federal Bankruptcy Act or any similar federal or state law, or if a petition under any federal or state bankruptcy or insolvency law is filed against the Contractor or that Subcontractor and such petition is not dismissed within sixty (60) days from the date of filing, or if the Contractor or that Subcontractor admits in writing its inability to pay its debts generally as they become due, or makes a general assignment for the benefit of creditors, or if a receiver, liquidator, trustee or assignee is appointed on account of such bankruptcy or insolvency;

.3 the Contractor or that Subcontractor abandons the Work;

.4 the Contractor or that Subcontractor submits an Application for Payment, sworn statement, waiver of lien, certified payroll, affidavit or other document of any nature whatsoever which is intentionally falsified or which the Contractor or that Subcontractor knows to contain a false statement;

.5 a mechanic's or materialman's lien or notice of lien or claim of lien is filed against any part of the Work, the public funds allocated for the Work, or on the site of the Project, if after written demand by the Owner such lien is not promptly released or satisfied; or

.6 the Contractor or that Subcontractor disregards any laws, statutes, ordinances, rules, regulations or orders of a governmental body or public or quasi-public authority having jurisdiction of the Work or the site of the Project.

The termination rights under this Subparagraph 14.2.1 shall be in addition to and not in limitation of any rights or remedies, contractual, statutory or otherwise.

§ 14.2.4 ~~If~~ In the event of termination pursuant to Section 14.2, the Contract Sum shall be reduced by Change Order to reflect any increased costs to the Owner of completing the Work, and if the unpaid balance of the Contract Sum exceeds ~~costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount~~ all costs to the Owner of completing the Work, the Contractor shall pay the difference to the Owner upon written demand by the Owner. Such costs shall include but not be limited to the cost of any additional architectural, managerial and administrative services required thereby, any costs incurred in retaining another Contractor or other Subcontractors, any additional interest or fees which the Owner must pay by reason of a delay in completing of the Work, reasonable attorneys' fees and expenses, and any other damages, costs and expenses the Owner may incur by reason of completing the Work or any delay thereof. The amount, if any, to be paid to the Contractor ~~or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application,~~ shall be certified by the Architect, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of the Contract.

...

§ 14.3.1 The Owner may, without ~~cause,~~ cause and in its sole discretion, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 ~~The~~ To the extent not due to the fault of Contractor, the Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work ~~executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.~~properly executed in conformance with the Contract Documents.

...

A Claim is a demand or assertion by ~~one of the parties~~ the Contractor seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The ~~term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The~~ responsibility to substantiate Claims shall rest with the ~~party making the Claim.~~Contractor.

...

Claims by ~~either~~ the ~~Owner or~~ Contractor must be initiated by written notice to the ~~other party~~ Owner and to the Initial Decision ~~Maker~~ Maker, if any, with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by ~~either party~~ the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the ~~claimant~~ Contractor first recognizes the condition giving rise to the Claim, whichever is later.

...

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of ~~cost and of~~ probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. For Claims for Additional Time, to the extent that an equitable extension of Time is warranted, such extension shall be the Contractor's sole and exclusive remedy.

...

§ 15.1.5.3 For all Claims for Additional Time, the Contractor shall support such Claims in the same manner as supporting additional time for Change Orders.

PAGE 40

.1 delay damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of ~~profit except anticipated profit arising directly from the Work.~~profit.

This mutual waiver is applicable, without limitation, to all consequential delay damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

...

§ 15.2.1 ~~Claims,~~ Claims by the Contractor ("Claims"), excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to ~~mediation of any Claim~~ arbitration or litigation, as the case may be, of any Claim initiated by Contractor and arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

...

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall ~~be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.~~not be binding.

~~§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.~~

~~§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.~~

...

~~§ 15.3 MEDIATION~~

~~§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.~~

~~§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.~~

~~§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.~~

§ 15.4.1 ~~If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~ In the sole and exclusive discretion of the Owner, all claims, disputes and other matters in question between any of the Architect, Owner, Contractor, Surety, Subcontractor or any material supplier arising out of, or relating to, agreements to which two or more of said parties are bound, or the Contract Documents or the breach thereof, shall, in the case of such election by the Owner, be decided by arbitration. If the Owner elects such arbitration, it shall be conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect at the time that the demand is made, as modified herein. In any such arbitration, the arbitrator shall make separate findings as to liability and the amount of damages with respect to each party to the arbitration to the extent any liability or responsibility for damages exists. The Architect, surety, subcontractors and material suppliers who have an interest in the dispute shall be joined as parties to the arbitration. The arbitrator shall have authority to decide all issues between the parties. The foregoing option of the Owner to arbitrate shall be specifically enforceable by the Owner under the prevailing arbitration law. The award rendered by the arbitrator shall

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.1.1 ~~A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but~~ If the Owner elects arbitration, in its sole discretion, notice of the demand for arbitration shall be filed in writing with the other part(ies) to the arbitration and with the American Arbitration Association. Such demand for arbitration shall be made within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when ~~the~~ institution of legal or equitable proceedings based on ~~the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.~~such claim, dispute or other matter in question would otherwise be barred by an applicable statute of limitations or repose. Whether such limitations have been met shall be decided by the arbitrator if contested by a party.

§ 15.4.1.2 All parties shall carry on the Work and perform their duties during any arbitration proceedings, and the Owner shall continue to make payments to the extent required by the Contract Documents. However, at the request of any party, contested payments may be placed in an escrow account pending resolution of the dispute.

§ 15.4.1.3 If the Owner elects arbitration, in its sole discretion, in addition to the other rules of the American Arbitration Association applicable to any arbitration hereunder, the following shall apply:

.1 Promptly after the empaneling of the arbitrator, the arbitrator shall establish a procedure for each party to set forth in writing and to serve upon each other party a detailed statement of its contentions of fact and law, along with appropriate responses thereto;

.2 All parties to the arbitration shall be entitled to reasonable discovery procedures as provided by the Illinois Code of Civil Procedure and Illinois Supreme Court Rules, as supplemented by rules to be established by the arbitrator;

.3 The arbitration shall be commenced and conducted as expeditiously as possible consistent with affording reasonable discovery as provided herein. Similarly, the scope of discovery, and the extent of proceedings hereunder relating to discovery, shall be consistent with the parties' intent that the arbitration be conducted as expeditiously as possible.

§ 15.4.2 ~~The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~In the event of any litigation or arbitration between the parties hereunder, the Contractor shall pay the Owner's reasonable attorneys' fees and court costs to the extent the court or tribunal determines the Owner is the prevailing party.

737066v1

~~§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

~~§ 15.4.4 CONSOLIDATION OR JOINDER~~

~~§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

~~§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.~~

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes: (1886278244)

~~§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.~~

Additions and Deletions Report for AIA Document A201™ – 2007. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved.** WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 14:58:53 on 02/06/2018 under Order No.2136325583 which expires on 08/23/2018, and is not for resale.
User Notes:
(1886278244)

SECTION 00 73 43 - PREVAILING WAGE REQUIREMENTS

1.1 REQUIREMENTS

A. Each Contractor shall comply with requirements of "An Act regulating wages of laborers, mechanics and other workmen employed in any public works by the State, County, City or by any public body or any political subdivision or by anyone under contract for public works".

B. If, during the course of work under this contract, the Department of Labor revises the prevailing rate hourly wages to be paid under this contract for any trade or occupation, Owner, will notify Contractor and each Subcontractor of the changes in the prevailing rate of hourly wages. Contractor shall have the sole responsibility and duty to ensure that the revised prevailing rate of hourly wages is paid by Contractor and all Subcontractors to each worker to whom a revised rate is applicable. Revisions to the prevailing wage as set forth above shall not result in an increase in the Contract Sum.

1.2 ACT AND ORDINANCES

A. "An Act requiring wages of laborers, mechanics and other workmen employed in any public works by the State, County, City of any public body or any political subdivision or by anyone under contract for public works . . . ", Illinois Revised Statutes, 1981, Chapter 48, Sections 39s1 through 39s.

1. A copy of the Illinois Department of Labor Prevailing Wages for McHenry County is included herein. The current rates are effective as of September 16, 2024, on IDOL website.

McHenry County Prevailing Wage Rates posted on 9/16/2024

						Overtime										
Trade Title	Rg	Type	C	Base	Foreman	M-F	Sa	Su	Hol	H/W	Pension	Vac	Trng	Other Ins	Add OT 1.5x owed	Add OT 2.0x owed
ASBESTOS ABT-GEN	All	ALL		50.15	51.15	1.5	1.5	2.0	2.0	15.53	19.10	0.00	0.91		0.00	0.00
ASBESTOS ABT-MEC	All	BLD		41.27	44.57	1.5	1.5	2.0	2.0	15.84	16.02	0.00	0.90		3.11	6.21
BOILERMAKER	All	BLD		55.76	60.77	2.0	2.0	2.0	2.0	6.97	26.44	0.00	3.34	1.95	0.00	38.26
BRICK MASON	All	BLD		52.06	57.27	1.5	1.5	2.0	2.0	12.70	24.54	0.00	1.24	0.00	3.99	7.98
CARPENTER	All	ALL		55.11	57.11	1.5	1.5	2.0	2.0	12.89	26.87	1.55	0.93	0.00	0.00	0.00
CEMENT MASON	All	ALL		51.00	53.00	2.0	1.5	2.0	2.0	12.19	29.96	0.00	0.80	0.00	0.00	0.00
CERAMIC TILE FINISHER	All	BLD		47.09	47.09	1.5	1.5	2.0	2.0	13.00	16.82	0.00	1.09	0.00	5.17	10.34
CERAMIC TILE LAYER	All	BLD		54.84	59.84	1.5	1.5	2.0	2.0	13.00	20.68	0.00	1.17	0.00	7.15	14.30
COMMUNICATION TECHNICIAN	All	BLD		45.48	47.88	1.5	1.5	2.0	2.0	14.37	18.21	0.00	0.91	0.00	9.56	19.12
ELECTRIC PWR EQMT OP	All	ALL		50.82	69.34	1.5	1.5	2.0	2.0	7.25	14.22	0.00	1.52	1.52	8.63	17.26
ELECTRIC PWR GRNDMAN	All	ALL		39.04	69.34	1.5	1.5	2.0	2.0	7.25	10.93	0.00	1.17	1.17	6.63	13.27
ELECTRIC PWR LINEMAN	All	ALL		61.09	69.34	1.5	1.5	2.0	2.0	7.25	17.10	0.00	1.83	1.83	10.38	20.76
ELECTRIC PWR TRK DRV	All	ALL		40.46	69.34	1.5	1.5	2.0	2.0	7.25	11.33	0.00	1.21	1.21	6.87	13.75
ELECTRICIAN	All	ALL		55.99	60.39	1.5	1.5	2.0	2.0	16.54	22.78	0.00	1.68		12.23	24.46
ELEVATOR CONSTRUCTOR	All	BLD		67.84	76.32	2.0	2.0	2.0	2.0	16.18	20.96	5.42	0.75		0.00	0.00
FENCE ERECTOR	E	ALL		51.00	53.00	1.5	1.5	2.0	2.0	13.74	18.32	0.00	0.75		0.00	0.00
FENCE ERECTOR	W	ALL		48.53	54.35	1.5	1.5	2.0	2.0	13.21	26.70	0.00	1.80	0.00	0.00	0.00
GLAZIER	All	BLD		51.55	53.05	1.5	2.0	2.0	2.0	15.64	26.18	0.00	2.27	0.00	0.00	0.00
HEAT/FROST INSULATOR	All	BLD		55.02	58.32	1.5	1.5	2.0	2.0	15.84	19.01	0.00	0.90		4.60	9.20
IRON WORKER	E	ALL		59.26	62.76	2.0	2.0	2.0	2.0	18.30	26.31	0.00	0.49	0.00	0.00	0.00
IRON WORKER	W	ALL		53.40	59.81	2.0	2.0	2.0	2.0	13.21	30.79	0.00	1.80	0.00	0.00	0.00
LABORER	All	ALL		50.15	50.90	1.5	1.5	2.0	2.0	15.53	19.10	0.00	0.91		0.00	0.00
LATHER	All	ALL		55.11	57.11	1.5	1.5	2.0	2.0	12.89	26.87	1.55	0.93	0.00	0.00	0.00
MACHINIST	All	BLD		58.39	62.39	1.5	1.5	2.0	2.0	9.93	8.95	1.85	1.47		0.00	0.00
MARBLE FINISHER	All	ALL		39.50	53.55	1.5	1.5	2.0	2.0	12.70	22.32	0.00	0.73	0.00	2.88	5.76
MARBLE SETTER	All	BLD		51.00	56.10	1.5	1.5	2.0	2.0	12.70	24.01	0.00	0.92	0.00	3.73	7.45

McHenry County Prevailing Wage Rates posted on 9/16/2024

MATERIAL TESTER I	All	ALL		40.15		1.5	1.5	2.0	2.0	15.53	19.10	0.00	0.91		0.00	0.00
MATERIALS TESTER II	All	ALL		45.15		1.5	1.5	2.0	2.0	15.53	19.10	0.00	0.91		0.00	0.00
MILLWRIGHT	All	ALL		55.11	57.11	1.5	1.5	2.0	2.0	12.89	26.87	1.55	0.93	0.00	0.00	0.00
OPERATING ENGINEER	All	BLD	1	60.80	64.80	2.0	2.0	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	BLD	2	59.50	64.80	2.0	2.0	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	BLD	3	56.95	64.80	2.0	2.0	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	BLD	4	55.20	64.80	2.0	2.0	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	BLD	5	64.55	64.80	2.0	2.0	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	BLD	6	61.80	64.80	2.0	2.0	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	BLD	7	63.80	64.80	2.0	2.0	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	FLT		50.50	50.50	1.5	1.5	2.0	2.0	23.95	21.40	2.00	2.85	0.00	0.00	0.00
OPERATING ENGINEER	All	HWY	1	59.00	63.00	1.5	1.5	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	HWY	2	58.45	63.00	1.5	1.5	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	HWY	3	56.40	63.00	1.5	1.5	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	HWY	4	55.00	63.00	1.5	1.5	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	HWY	5	53.80	63.00	1.5	1.5	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	HWY	6	62.00	63.00	1.5	1.5	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
OPERATING ENGINEER	All	HWY	7	60.00	63.00	1.5	1.5	2.0	2.0	23.70	20.80	2.00	2.70	0.00	0.00	0.00
ORNAMENTAL IRON WORKER	E	ALL		57.51	60.51	2.0	2.0	2.0	2.0	14.31	26.50	0.00	2.00	0.00	0.00	0.00
PAINTER	All	ALL		53.05	55.05	1.5	1.5	1.5	2.0	16.08	9.90	0.00	1.65	0.00	0.00	0.00
PAINTER - SIGNS	All	BLD		45.49	51.09	1.5	1.5	2.0	2.0	8.20	16.81	0.00	0.00	0.00	0.00	0.00
PILEDRIVER	All	ALL		55.11	57.11	1.5	1.5	2.0	2.0	12.89	26.87	1.55	0.93	0.00	0.00	0.00
PIPEFITTER	All	BLD		57.00	60.00	1.5	1.5	2.0	2.0	13.65	22.85	0.00	3.12	0.00	0.00	0.00
PLASTERER	All	BLD		50.00	53.00	1.5	1.5	2.0	2.0	17.81	21.22	0.00	1.15		0.00	0.00
PLUMBER	All	BLD		58.55	62.05	1.5	1.5	2.0	2.0	17.75	17.74	0.00	1.83		0.00	0.00
ROOFER	All	BLD		50.25	55.25	1.5	1.5	2.0	2.0	11.83	16.44	0.00	1.11	0.00	0.00	0.00
SHEETMETAL WORKER	All	BLD		56.35	60.86	1.5	1.5	2.0	2.0	15.01	19.43	0.00	1.59	2.62	0.00	0.00
SPRINKLER FITTER	All	BLD		60.10	62.85	1.5	1.5	2.0	2.0	14.95	19.30	0.00	1.10	0.00	0.00	0.00
STEEL ERECTOR	E	ALL		59.26	62.76	2.0	2.0	2.0	2.0	18.30	26.31	0.00	0.49	0.00	0.00	0.00

McHenry County Prevailing Wage Rates posted on 9/16/2024

STONE MASON	All	BLD		52.06	57.27	1.5	1.5	2.0	2.0	12.70	24.54	0.00	1.24	0.00	3.99	7.98
SURVEY WORKER	All	BLD		50.15	50.90	1.5	1.5	2.0	2.0	15.53	19.10	0.00	0.91		0.00	0.00
SURVEY WORKER	All	HWY		50.15	50.90	1.5	1.5	2.0	2.0	15.53	19.10	0.00	0.91		0.00	0.00
TERRAZZO FINISHER	All	BLD		48.94	48.94	1.5	1.5	2.0	2.0	13.00	18.42	0.00	1.11	0.00	4.22	8.44
TERRAZZO MECHANIC	All	BLD		52.85	56.35	1.5	1.5	2.0	2.0	13.00	19.81	0.00	1.15	0.00	4.47	8.94
TRAFFIC SAFETY WORKER I	All	HWY		42.10	43.70	1.5	1.5	2.0	2.0	11.11	9.81	0.00	1.05	0.00	0.00	0.00
TRAFFIC SAFETY WORKER II	ALL	HWY		43.10	44.70	1.5	1.5	2.0	2.0	11.11	9.81	0.00	1.05	0.00	0.00	0.00
TRUCK DRIVER	All	ALL	1	44.54		1.5	1.5	2.0	2.0	13.15	13.15	0.00	0.25	0.00	0.00	0.00
TRUCK DRIVER	All	ALL	2	44.69		1.5	1.5	2.0	2.0	13.15	13.15	0.00	0.25	0.00	0.00	0.00
TRUCK DRIVER	All	ALL	3	44.89		1.5	1.5	2.0	2.0	13.15	13.15	0.00	0.25	0.00	0.00	0.00
TRUCK DRIVER	All	ALL	4	45.09		1.5	1.5	2.0	2.0	13.15	13.15	0.00	0.25	0.00	0.00	0.00
TUCKPOINTER	All	BLD		51.53	52.53	1.5	1.5	2.0	2.0	10.05	22.66	0.00	1.15	0.00	0.00	0.00

Legend
Rg Region
Type Trade Type - All,Highway,Building,Floating,Oil & Chip,Rivers
C Class
Base Base Wage Rate
OT M-F Unless otherwise noted, OT pay is required for any hour greater than 8 worked each day, Mon through Fri. The number listed is the multiple of the base wage.
OT Sa Overtime pay required for every hour worked on Saturdays
OT Su Overtime pay required for every hour worked on Sundays
OT Hol Overtime pay required for every hour worked on Holidays
H/W Health/Welfare benefit
Vac Vacation
Trng Training
Other Ins Employer hourly cost for any other type(s) of insurance provided for benefit of worker.

Explanations MCHENRY COUNTY

IRON WORKERS (EAST) - Starting at the Wisconsin Line at Route 47 South to Route 14. Then Route 14 Southeast to Virginia Road. Then Virginia Road Southeast to Route 31, Route 31 South to Kane County Line.

FENCE ERECTOR (EAST) - Same as IRON WORKER ABOVE.

ORNAMENTAL IRON WORKER (EAST) - Same as IRON WORKER ABOVE.

McHenry County Prevailing Wage Rates posted on 9/16/2024

STEEL ERECTOR (EAST) - Same as IRON WORKER ABOVE.

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day and Veterans Day in some classifications/counties. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration. If in doubt, please check with IDOL.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date.

ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

CERAMIC TILE FINISHER

The grouting, cleaning, and polishing of all classes of tile, whether for interior or exterior purposes, all burned, glazed or unglazed products; all composition materials, granite tiles, warning detectable tiles, cement tiles, epoxy composite materials, pavers, glass, mosaics, fiberglass, and all substitute materials, for tile made in tile-like units; all mixtures in tile like form of cement, metals, and other materials that are for and intended for use as a finished floor surface, stair treads, promenade roofs, walks, walls, ceilings, swimming pools, and all other places where tile is to form a finished interior or exterior. The mixing of all setting mortars including but not limited to thin-set mortars, epoxies, wall mud, and any other sand and cement mixtures or adhesives when used in the preparation, installation, repair, or maintenance of tile and/or similar materials. The handling and unloading of all sand, cement, lime, tile, fixtures, equipment, adhesives, or any other materials to be used in the preparation, installation, repair, or maintenance of tile and/or similar materials. Ceramic Tile Finishers shall fill all joints and voids regardless of method on all tile work, particularly and especially after installation of said tile work. Application of any and all protective coverings to all types of tile installations including, but not be limited to, all soap compounds, paper products, tapes, and all polyethylene coverings, plywood, masonite, cardboard, and any new type of products that may be used to protect tile installations, Blastrac equipment, and all floor scarifying equipment used in preparing floors to receive tile. The clean up and removal of all waste and materials. All demolition of existing tile floors and walls to be re-tiled.

COMMUNICATIONS TECHNICIAN

Construction, installation, maintenance and removal of telecommunication facilities (voice, sound, data and video), telephone, security systems, fire alarm systems that are a component of a multiplex system and share a common cable, and data inside wire, interconnect, terminal equipment, central offices, PABX and equipment, micro waves, V-SAT, bypass, CATV, WAN (wide area network), LAN (local area networks), and ISDN (integrated system digital network), pulling of wire in raceways, but not the installation of raceways.

McHenry County Prevailing Wage Rates posted on 9/16/2024

MARBLE FINISHER

Loading and unloading trucks, distribution of all materials (all stone, sand, etc.), stocking of floors with material, performing all rigging for heavy work, the handling of all material that may be needed for the installation of such materials, building of scaffolding, polishing if needed, patching, waxing of material if damaged, pointing up, caulking, grouting and cleaning of marble, holding water on diamond or Carborundum blade or saw for setters cutting, use of tub saw or any other saw needed for preparation of material, drilling of holes for wires that anchor material set by setters, mixing up of molding plaster for installation of material, mixing up thin set for the installation of material, mixing up of sand to cement for the installation of material and such other work as may be required in helping a Marble Setter in the handling of all material in the erection or installation of interior marble, slate, travertine, art marble, serpentine, alberene stone, blue stone, granite and other stones (meaning as to stone any foreign or domestic materials as are specified and used in building interiors and exteriors and customarily known as stone in the trade), carrara, sanionyx, vitrolite and similar opaque glass and the laying of all marble tile, terrazzo tile, slate tile and precast tile, steps, risers treads, base, or any other materials that may be used as substitutes for any of the aforementioned materials and which are used on interior and exterior which are installed in a similar manner.

MATERIAL TESTER I: Hand coring and drilling for testing of materials; field inspection of uncured concrete and asphalt.

MATERIAL TESTER II: Field inspection of welds, structural steel, fireproofing, masonry, soil, facade, reinforcing steel, formwork, cured concrete, and concrete and asphalt batch plants; adjusting proportions of bituminous mixtures.

OPERATING ENGINEER - BUILDING

Class 1. Asphalt Plant; Asphalt Spreader; Autograde; Backhoes with Caisson Attachment; Batch Plant; Benoto (requires Two Engineers); Boiler and Throttle Valve; Caisson Rigs; Central Redi-Mix Plant; Combination Back Hoe Front End-loader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Conveyor (Truck Mounted); Concrete Paver Over 27E cu. ft; Concrete Paver 27E cu. ft. and Under: Concrete Placer; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes, All; Cranes, Hammerhead; Cranes, (GCI and similar Type); Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derricks, Traveling; Formless Curb and Gutter Machine; Grader, Elevating; Grouting Machines; Heavy Duty Self-Propelled Transporter or Prime Mover; Highlift Shovels or Front Endloader 2-1/4 yd. and over; Hoists, Elevators, outside type rack and pinion and similar machines; Hoists, One, Two and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoes; Hydraulic Boom Trucks; Hydro Vac (and similar equipment); Locomotives, All; Motor Patrol; Lubrication Technician; Manipulators; Pile Drivers and Skid Rig; Post Hole Digger; Pre-Stress Machine; Pump Cretes Dual Ram; Pump Cretes: Squeeze Cretes-Screw Type Pumps; Gypsum Bulker and Pump; Raised and Blind Hole Drill; Roto Mill Grinder; Scoops - Tractor Drawn; Slip-Form Paver; Straddle Buggies; Operation of Tie Back Machine; Tournapull; Tractor with Boom and Side Boom; Trenching Machines.

Class 2. Boilers; Broom, All Power Propelled; Bulldozers; Concrete Mixer (Two Bag and Over); Conveyor, Portable; Forklift Trucks; Highlift Shovels or Front Endloaders under 2-1/4 yd.; Hoists, Automatic; Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Laser Screed; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted); Rollers, All; Steam Generators; Tractors, All; Tractor Drawn Vibratory Roller; Winch Trucks with "A" Frame.

Class 3. Air Compressor; Combination Small Equipment Operator; Generators; Heaters, Mechanical; Hoists, Inside Elevators

(remodeling or renovation work); Hydraulic Power Units (Pile Driving, Extracting, and Drilling); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Low Boys; Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 4. Bobcats and/or other Skid Steer Loaders; Oilers; and Brick Forklift.

Class 5. Assistant Craft Foreman.

Class 6. Gradall.

Class 7. Mechanics; Welders.

OPERATING ENGINEERS - HIGHWAY CONSTRUCTION

Class 1. Asphalt Plant; Asphalt Heater and Planer Combination; Asphalt Heater Scarfire; Asphalt Spreader; Autograder/GOMACO or other similar type machines: ABG Paver; Backhoes with Caisson Attachment; Ballast Regulator; Belt Loader; Caisson Rigs; Car Dumper; Central Redi-Mix Plant; Combination Backhoe Front Endloader Machine, (1 cu. yd. Backhoe Bucket or over or with attachments); Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Paver over 27E cu. ft.; Concrete Placer; Concrete Tube Float; Cranes, all attachments; Cranes, Tower Cranes of all types: Creter Crane: Spider Crane; Crusher, Stone, etc.; Derricks, All; Derrick Boats; Derricks, Traveling; Dredges; Elevators, Outside type Rack & Pinion and Similar Machines; Formless Curb and Gutter Machine; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver Truck Mounted; Hoists, One, Two and Three Drum; Heavy Duty Self-Propelled Transporter or Prime Mover; Hydraulic Backhoes; Backhoes with shear attachments up to 40' of boom reach; Lubrication Technician; Manipulators; Mucking Machine; Pile Drivers and Skid Rig; Pre-Stress Machine; Pump Cretes Dual Ram; Rock Drill - Crawler or Skid Rig; Rock Drill - Truck Mounted; Rock/Track Tamper; Roto Mill Grinder; Slip-Form Paver; Snow Melters; Soil Test Drill Rig (Truck Mounted); Straddle Buggies; Hydraulic Telescoping Form (Tunnel); Operation of Tieback Machine; Tractor Drawn Belt Loader; Tractor Drawn Belt Loader (with attached pusher - two engineers); Tractor with Boom; Tractaire with Attachments; Traffic Barrier Transfer Machine; Trenching; Truck Mounted Concrete Pump with Boom; Raised or Blind Hole Drills (Tunnel Shaft); Underground Boring and/or Mining Machines 5 ft. in diameter and over tunnel, etc; Underground Boring and/or Mining Machines under 5 ft. in diameter; Wheel Excavator; Widener (APSCO).

Class 2. Batch Plant; Bituminous Mixer; Boiler and Throttle Valve; Bulldozers; Car Loader Trailing Conveyors; Combination Backhoe Front Endloader Machine (Less than 1 cu. yd. Backhoe Bucket or over or with attachments); Compressor and Throttle Valve; Compressor, Common Receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S Series to and including 27 cu. ft.; Concrete Spreader; Concrete Curing Machine, Burlap Machine, Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or Similar Type); Drills, All; Finishing Machine - Concrete; Highlift Shovels or Front Endloader; Hoist - Sewer Dragging Machine; Hydraulic Boom Trucks (All Attachments); Hydro-Blaster; Hydro Excavating (excluding hose work); Laser Screed; All Locomotives, Dinky; Off-Road Hauling Units (including articulating) Non Self-Loading Ejection Dump; Pump Cretes: Squeeze Cretes - Screw Type Pumps, Gypsum Bulker and Pump; Roller, Asphalt; Rotary Snow Plows; Rototiller, Seaman, etc., self-propelled; Self-Propelled Compactor; Spreader - Chip - Stone, etc.; Scraper - Single/Twin Engine/Push and Pull; Scraper - Prime Mover in Tandem (Regardless of Size); Tractors pulling attachments, Sheeps Foot, Disc, Compactor, etc.; Tug Boats.

McHenry County Prevailing Wage Rates posted on 9/16/2024

Class 3. Boilers; Brooms, All Power Propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer (Two Bag and Over); Conveyor, Portable; Farm-Type Tractors Used for Mowing, Seeding, etc.; Forklift Trucks; Grouting Machine; Hoists, Automatic; Hoists, All Elevators; Hoists, Tugger Single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-Hole Digger; Power Saw, Concrete Power Driven; Pug Mills; Rollers, other than Asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with "A" Frame; Work Boats; Tamper-Form-Motor Driven.

Class 4. Air Compressor; Combination - Small Equipment Operator; Directional Boring Machine; Generators; Heaters, Mechanical; Hydraulic Power Unit (Pile Driving, Extracting, or Drilling); Light Plants, All (1 through 5); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Pumps, Well Points; Vacuum Trucks (excluding hose work); Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 5. SkidSteer Loader (all); Brick Forklifts; Oilers.

Class 6. Field Mechanics and Field Welders

Class 7. Dowell Machine with Air Compressor; Gradall and machines of like nature.

OPERATING ENGINEERS - FLOATING

Diver. Diver Wet Tender, Diver Tender, ROV Pilot, ROV Tender

SURVEY WORKER

Operates survey equipment (such as levels, transits, data collectors, GPS and robotic total stations) for the purpose of performing construction layout and/or grade checking.

SURVEY FOREMAN

Operates survey equipment (such as levels, transits, data collectors, GPS and robotic total stations) for the purpose of performing construction layout and/or grade checking: oversees survey crew operations; and/or coordinates work of survey crews.

TRAFFIC SAFETY Worker I

Traffic Safety Worker I - work associated with the delivery, installation, pick-up and servicing of safety devices during periods of roadway construction, including such work as set-up and maintenance of barricades, barrier wall reflectors, drums, cones, delineators, signs, crash attenuators, glare screen and other such items, and the layout and application or removal of conflicting and/or temporary roadway markings utilized to control traffic in construction zones, as well as flagging for these operations.

TRAFFIC SAFETY WORKER II

Work associated with the installation and removal of permanent pavement markings and/or pavement markers including both installations performed by hand and installations performed by truck.

TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION

McHenry County Prevailing Wage Rates posted on 9/16/2024

Class 1. Two or three Axle Trucks. A-frame Truck when used for transportation purposes; Air Compressors and Welding Machines, including those pulled by cars, pick-up trucks and tractors; Ambulances; Batch Gate Lockers; Batch Hopperman; Car and Truck Washers; Carry-alls; Fork Lifts and Hoisters; Helpers; Mechanics Helpers and Greasers; Oil Distributors 2-man operation; Pavement Breakers; Pole Trailer, up to 40 feet; Power Mower Tractors; Self-propelled Chip Spreader; Skipman; Slurry Trucks, 2-man operation; Slurry Truck Conveyor Operation, 2 or 3 man; Teamsters; Unskilled Dumpman; and Truck Drivers hauling warning lights, barricades, and portable toilets on the job site.

Class 2. Four axle trucks; Dump Crets and Adgetors under 7 yards; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnapulls or Turnatrailers when pulling other than self-loading equipment or similar equipment under 16 cubic yards; Mixer Trucks under 7 yeards; Ready-mix Plant Hopper Operator, and Winch Trucks, 2 Axles.

Class 3. Five axle trucks; Dump Crets and Adgetors 7 yards and over; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnatrailers or turnapulls when pulling other than self-loading equipment or similar equipment over 16 cubic yards; Explosives and/or Fission Material Trucks; Mixer Trucks 7 yards or over; Mobile Cranes while in transit; Oil Distributors, 1-man operation; Pole Trailer, over 40 feet; Pole and Expandable Trailers hauling material over 50 feet long; Slurry trucks, 1-man operation; Winch trucks, 3 axles or more; Mechanic--Truck Welder and Truck Painter.

Class 4. Six axle trucks; Dual-purpose vehicles, such as mounted crane trucks with hoist and accessories; Foreman; Master Mechanic; Self-loading equipment like P.B. and trucks with scoops on the front.

TERRAZZO FINISHER

The handling of sand, cement, marble chips, and all other materials that may be used by the Mosaic Terrazzo Mechanic, and the mixing, grinding, grouting, cleaning and sealing of all Marble, Mosaic, and Terrazzo work, floors, base, stairs, and wainscoting by hand or machine, and in addition, assisting and aiding Marble, Masonic, and Terrazzo Mechanics.

Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

McHenry County Prevailing Wage Rates posted on 9/16/2024

MATERIAL TESTER & MATERIAL TESTER/INSPECTOR I AND II

Notwithstanding the difference in the classification title, the classification entitled "Material Tester I" involves the same job duties as the classification entitled "Material Tester/Inspector I". Likewise, the classification entitled "Material Tester II" involves the same job duties as the classification entitled "Material Tester/Inspector II".

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.
6. Miscellaneous provisions.

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: 2024 Renovations – Bid Package 2

1. Project Location: McHenry County College, 8900 US Hwy 14, Crystal Lake, IL 60012.

B. Owner: The Board of Trustees, McHenry County College.

1. Owner's Representative: Mr. Dave Dammon, Assistant Vice President of Facilities

C. Architect: Demonica Kemper Architects, LLC.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

C. Insurance:

1. Designated Purchaser:

a. Contractor shall purchase and maintain Builder's Risk Insurance in accordance with the General Conditions.

1.5 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations. Contractor shall photo-document condition of existing facilities prior to beginning work to identify any damage that exists prior to beginning work.

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. Date of Commencement: Material Procurement and Field Verification for all areas of work may commence upon award of Contract. Work may commence on site as indicated below for each area of work…

1. IT Server Room, EMS Lab, Building C Corridor, and Building D Corridor: December 16, 2024

2. Library: January 6, 2025

C. Intermediate Deadlines and Sequencing Requirements:

1. IT Server Room: The contractor shall provide a full construction sequencing plan, detailing the start, duration, and completion of the work, to the Owner / Architect for review and approval prior to commencing any on-site work. The contractor shall structure the sequencing plan to minimize downtime and disruption of the existing HVAC system in the IT server room or the continued operation of the IT server systems. Refer to Article 1.6-H for additional information.

2. Building C Corridors / Building D Corridors: Contractor will complete all work during breaks (as noted below) or in a phased sequence during low-occupancy time periods as coordinated with the owner.

    a. Winter Break (December 16, 2024 to January 17, 2025): Complete removal of all flooring and wall base as indicated on the demo drawings and clean / prep the slab for new work.
    b. Spring Break (March 22, 2025 to March 30, 2025): Complete installation of new flooring and wall base as indicated on the finish drawings.
    c. Summer Break (May 19, 2025 to Substantial Completion): Complete installation of the new ceilings, including all devices, lighting, sprinklers, diffusers, and grilles as noted on the drawings. Complete all wall painting indicated for Building D.

D. Date of Substantial Completion: All Work must be substantially complete on or before July 11, 2025.

E. Liquidated Damages: Refer to Article 9.8.8 of the General Conditions of the Contract for construction Liquidated Damages associated with this Project. Liquidated Damages shall be in the amount of $1,000.00 per calendar day starting July 14, 2025.

F. On-Site Work Hours: Limit work in the existing building to normal business working hours of 6:00 a.m. to 10:00 p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: All workers must check in at the office of the McHenry County College Police Department.

G. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than three days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.
3. Schedule all interruptions to occur between 10:00 pm and 6:00 am.

H. Continuous Operation of IT Server Systems: IT Server Systems will be required to remain fully operational throughout construction. Contractor will be responsible to protect full IT Systems, including all cabling, utilities, cable trays, etc. throughout construction.

1. Temporary cooling for the IT Systems will be provided and maintained by the Owner.
2. Any modifications to the cabling routing due to the new work will be completed by the Owner’s vendor.

I. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than three days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

J. Nonsmoking Campus: Smoking is not permitted on Campus.

K. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

L. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

M. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 21 00 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Related Requirements:

1. Section 01 22 00 "Unit Prices" for procedures for using unit prices, including adjustment of quantity allowances when applicable.
2. Section 01 40 00 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.5 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 UNIT-COST ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.9 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.10 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.11 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

B. See Construction Manager's "Scope of Work" documents for allowances to be included by each Contractor.

3.3 SCHEDULE OF ALLOWANCES

A. ALLOWANCE NO. 1: Unforseen Condition Allowance: Include an allowance of $25,000.00.

B. ALLOWANCE NO. 2: Fire Wall Allowance: Include an allowance of $25,000.00.

END OF SECTION 01 21 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. ALTERNATE NO. 1: Deduct from the Lump Sum Base Bid to eliminate the Liquidated Damages Clause from the Contract.

B. ALTERNATE NO. 2: Deduct from the Lump Sum Base Bid to eliminate the entire scope of work at the Toilet Room Renovation in the First Floor of Building D. Refer to Drawings for additional details.

C. ALTERNATE NO. 3: Deduct from the Lump Sum Base Bid to eliminate the entire scope of work at the Server Room Cooling System Replacement in the First Floor of Building A. Refer to Drawings for additional details.

D. ALTERNATE NO. 4: Deduct from the Lump Sum Base Bid to leave the raised flooring areas, indicated on the drawing, under the existing server racks / equipment as existing to remain in lieu of a new raised flooring system at the Server Room Cooling System Replacement in the First Floor of Building A. Refer to architectural drawings for location and additional details. Alternate No. 4 will not apply if Alternate No. 3 is selected.

E. ALTERNATE NO. 5: Add to the Lump Sum Base Bid to raise the section of the Hot Water Supply / Hot Water Return piping at the Library Renovation in the Second Floor of Building A. Refer to mechanical drawings for location and additional details.

END OF SECTION 01 23 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 01 23 00 "Alternates" for products selected under an alternate.
2. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A .
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions" or similar form

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail." or similar forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail." or similar form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 01 21 00 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 .

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 or similar form acceptable to Architect. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with continuation sheets.
b. Submittal schedule.
c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. Name of Architect.
    c. Architect's project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

        1) Labor.
        2) Materials.
        3) Equipment.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Payroll Certification: Submit Payroll Certification in accordance with the Prevailing Wage Act as ammended in Public Act 094-0515, including, but not limited to, the following:

1. Certified payroll for all laborers, mechanics, and other workers employed on the project, including each worker's name, address, telephone number (when available,) social security number, classification, the hourly wages paid in each pay period, the number of hours worked each day, and the starting and ending times of work each day.
2. Statement signed by the contractor or subcontractor which states that:

a. Such records are true and accurate;
b. The hourly rate paid to each worker is not less than the general prevailing rate of hourly wages required by the Prevailing Wage Act;

c. The contractor or subcontractor is aware that filing a certified payroll that he/she knows to be false is a Class B misdemeanor. A General Contractor is not prohibited from relying on the certification of a lower tier subcontractor, provided the General Contractor does not knowingly rely on a subcontractor's false certification. Any contractor or subcontractor subject to the Prevailing Wage Act who fails to submit a certified payroll or knowingly files a false certified payroll is in violation of the Prevailing Wage Act and guilty of a Class B misdemeanor.

F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

   a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
   b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
   c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

G. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).

4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire Owner's insurance.

J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. Requests for Information (RFIs).
4. Project Web site.
5. Project meetings.

B. Related Requirements:

1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, on Project Web site, and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
f. Indicate required installation sequences.
g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:

a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
c. Fire-rated enclosures around ductwork.

7. Electrical Work: Show the following:

a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
d. Location of pull boxes and junction boxes, dimensioned from column center lines.

8. Fire-Protection System: Show the following:

a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.
2. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
b. Digital Data Software Program: Drawings are available in Revit 2014.
c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

1.7 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. RFI number, numbered sequentially.
6. RFI subject.
7. Specification Section number and title and related paragraphs, as appropriate.
8. Drawing number and detail references, as appropriate.
9. Field dimensions and conditions, as appropriate.
10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
11. Contractor's signature.
12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.

1. Attachments shall be electronic files in Adobe Acrobat PDF format.

D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:

1. Project name.
2. Name and address of Contractor.
3. RFI number including RFIs that were returned without action or withdrawn.
4. RFI description.
5. Date the RFI was submitted.

1.8 PROJECT WEB SITE

A. Provide, administer, and use Project Web site for purposes of hosting and managing project communication and documentation until Final Completion. Project Web site shall include the following functions:

1. Project directory.
2. Project correspondence.
3. Meeting minutes.
4. Contract modifications forms and logs.
5. RFI forms and logs.
6. Task and issue management.
7. Photo documentation.
8. Schedule and calendar management.
9. Submittals forms and logs.
10. Payment application forms.
11. Drawing and specification document hosting, viewing, and updating.

12. Online document collaboration.
13. Reminder and tracking functions.
14. Archiving functions.

B. On completion of Project, provide one complete archive copy(ies) of Project Web site files to Owner and to Architect in a digital storage format acceptable to Architect.

C. Provide the following Project Web site software packages under their current published licensing agreements:

1. Procore
2. Autodesk Plangrid
3. Submittal Exchange

D. Contractor, subcontractors, and other parties granted access by Contractor to Project Web site shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.
b. Phasing.
c. Critical work sequencing and long-lead items.
d. Designation of key personnel and their duties.
e. Lines of communications.
f. Procedures for processing field decisions and Change Orders.
g. Procedures for RFIs.
h. Procedures for testing and inspecting.

i. Procedures for processing Applications for Payment.
j. Distribution of the Contract Documents.
k. Submittal procedures.
l. Preparation of record documents.
m. Use of the premises and existing building.
n. Work restrictions.
o. Working hours.
p. Owner's occupancy requirements.
q. Responsibility for temporary facilities and controls.
r. Procedures for moisture and mold control.
s. Procedures for disruptions and shutdowns.
t. Construction waste management and recycling.
u. Parking availability.
v. Office, work, and storage areas.
w. Equipment deliveries and priorities.
x. First aid.
y. Security.
z. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility requirements.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written instructions.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.

x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of record documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Submittal of written warranties.
d. Requirements for preparing operations and maintenance data.
e. Requirements for delivery of material samples, attic stock, and spare parts.
f. Requirements for demonstration and training.
g. Preparation of Contractor's punch list.
h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
i. Submittal procedures.
j. Coordination of separate contracts.
k. Owner's partial occupancy requirements.
l. Installation of Owner's furniture, fixtures, and equipment.
m. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at weekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Resolution of BIM component conflicts.
4) Status of submittals.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site utilization.
9) Temporary facilities and controls.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) Status of RFIs.
15) Status of proposal requests.
16) Pending changes.
17) Status of Change Orders.
18) Pending claims and disputes.
19) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

c. Review present and future needs of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Change Orders.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Special reports.

B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
2. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.

B. Startup construction schedule.

1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from [commencement of the Work] [the Notice to Proceed] until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Material Location Reports: Submit at monthly intervals.

H. Site Condition Reports: Submit at time of discovery of differing conditions.

I. Special Reports: Submit at time of unusual event.

J. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including work stages .
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use of premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

4. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Mockups.
    e. Fabrication.
    f. Sample testing.
    g. Deliveries.
    h. Installation.
    i. Tests and inspections.
    j. Adjusting.
    k. Curing.
    l. Startup and placement into final use and operation.

5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

   a. Structural completion.
   b. Temporary enclosure and space conditioning.
   c. Permanent space enclosure.
   d. Completion of mechanical installation.
   e. Completion of electrical installation.
   f. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:

   1. Temporary enclosure and space conditioning.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

   1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

   1. Unresolved issues.
   2. Unanswered Requests for Information.
   3. Rejected or unreturned submittals.
   4. Notations on returned submittals.
   5. Pending modifications affecting the Work and Contract Time.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 STARTUP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's construction schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.

a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

a. Preparation and processing of submittals.
b. Mobilization and demobilization.
c. Purchase of materials.
d. Delivery.
e. Fabrication.
f. Utility interruptions.
g. Installation.
h. Testing and commissioning.
i. Punch list and final completion.
j. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.

3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.

    a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
    b. Total cost assigned to activities shall equal the total Contract Sum.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

    a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
    b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.4 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

    a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    b. Digital Drawing Software Program: The Contract Drawings are available in Revit 2017.
    c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
    d. The following digital data files will by furnished for each appropriate discipline:

        1) Floor plans.
        2) Reflected ceiling plans.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner**,** containing the following information:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of firm or entity that prepared submittal.
g. Names of subcontractor, manufacturer, and supplier.
h. Category and type of submittal.
i. Submittal purpose and description.
j. Specification Section number and title.
k. Specification paragraph number or drawing designation and generic name for each of multiple items.
l. Drawing number and detail references, as appropriate.
m. Location(s) where product is to be installed, as appropriate.
n. Related physical samples submitted directly.
o. Indication of full or partial submittal.
p. Transmittal number, numbered consecutively.
q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project.
2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

    a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.

e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

a. PDF electronic file.

4. BIM File Incorporation: Develop and incorporate Shop Drawing files into Building Information Model established for Project.

a. Prepare Shop Drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.
b. Refer to Section 01 31 00 "Project Management and Coordination" for requirements for coordination drawings.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.
e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:

a. PDF electronic file.

F. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00 "Payment Procedures."

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 01 78 23 "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

C. BIM File Incorporation: Incorporate delegated-design drawing and data files into Building Information Model established for Project.

1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 77 00 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data : For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

A. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

B. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.8 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

1.9 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association (The) www.aluminum.org	(703) 358-2960
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists www.aatcc.org	(919) 549-8141
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	American Concrete Institute www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AHRI	Air-Conditioning, Heating, andRefrigeration Institute, The	(703) 524-8800

	www.ahrinet.org	
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(405) 780-7372
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International	(800) 843-2763

	(American Society of Mechanical Engineers International) www.asme.org	(973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500
ATIS	Alliance for Telecommunications Industry Solutions www.atis.org	(202) 628-6380
AWCMA	American Window Covering Manufacturers Association (Now WCMA)	
AWCI	Association of the Wall and Ceiling Industry www.awci.org	(703) 534-8300
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWPA	American Wood Protection Association (Formerly: American Wood Preservers' Association) www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI, Inc. www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
CCC	Carpet Cushion Council www.carpetcushion.org	(610) 527-3880
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association	(613) 230-9263

	www.canelect.ca	
CEA	Consumer Electronics Association www.ce.org	(866) 858-1555 (703) 907-7600
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	 (703) 724-1128
CRI	Carpet and Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200 (800) 328-6306
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CSA	Canadian Standards Association www.csa.ca	(800) 463-6727 (416) 747-4000
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute	(703) 222-2010

	www.dhi.org	
ECA	Electrical Components Association www.ec-central.org	(703)907-8024
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee http://content.asce.org/ejcdc/	(703) 295-6000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association (Electrostatic Discharge Association) www.esda.org	(315) 339-6937
ETL SEMCO	Intertek ETL SEMCO (Formerly: ITS - Intertek Testing Service NA) www.intertek-etlsemko.com	(800) 967-5352
FIBA	Federation Internationale de Basketball (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation) www.fivb.ch	41 21 345 35 35
FM Approvals	FM Approvals LLC www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridaroof.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(301) 277-8686
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208

GRI	(Part of GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HI/GAMA	Hydronics Institute/Gas Appliance Manufacturers Association Division of Air-Conditioning, Heating, and Refrigeration Institute (AHRI) www.ahrinet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAPSC	International Association of Professional Security Consultants www.iapsc.org	(515) 282-8192
ICBO	International Conference of Building Officials www.iccsafe.org	(888) 422-7233
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
ICPA	International Cast Polymer Association www.icpa-hq.org	(703) 525-0320
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IES	Illuminating Engineering Society of North America www.iesna.org	(703) 525-0320
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc.	(812) 275-4426

	www.iliai.com	
ISA	Instrumentation, Systems, and Automation Society, The www.isa.org	(919) 549-8411
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (801) 341-7360
ITS	Intertek Testing Service NA (Now ETL SEMCO)	
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LGSEA	Light Gauge Steel Engineers Association www.arcat.com	(202) 263-4488
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MCA	Metal Construction Association www.metalconstruction.org	(847) 375-4718
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(888) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613

NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6223 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAGWS	National Association for Girls and Women in Sport www.aahperd.org/nagws/	(800) 213-7193, ext. 453
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 222-2300
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (269) 488-6382
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890

NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) www.nofma.org	(901) 526-5016
NOMMA	National Ornamental & Miscellaneous Metals Association www.nomma.org	(888) 516-8585
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736 (540) 751-0930
NWFA	National Wood Flooring Association www.nwfa.org	(800) 422-4556 (636) 519-9663
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.cee.uiuc.edu	(217) 333-3929
PTI	Post-Tensioning Institute www.post-tensioning.org	(248) 848-3180
RCSC	Research Council on Structural Connections www.boltcouncil.org	
RFCI	Resilient Floor Covering Institute www.rfci.com	(706) 882-3833
RIS	Redwood Inspection Service www.redwoodinspection.com	(925) 935-1499
SAE	SAE International	(877) 606-7323

	www.sae.org	(724) 776-4841
SCAQMD	South Coast Air Quality Management District www.aqmd.com	(909) 396-2000
SCTE	Society of Cable Telecommunications Engineers www.scte.org	(800) 542-5040 (610) 363-6888
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(877) 294-5424 (516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SIA	Security Industry Association www.siaonline.org	(866) 817-8888 (703) 683-2075
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265

SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWPA	Submersible Wastewater Pump Association www.swpa.org	(847) 681-1868
TCA	Tilt-Up Concrete Association www.tilt-up.org	(319) 895-6911
TCNA	Tile Council of North America, Inc. www.tileusa.com	(864) 646-8453
TEMA	Tubular Exchanger Manufacturers Association www.tema.org	(914) 332-0040
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555
TRI	Tile Roofing Institute www.tileroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association www.wcmanet.org	(212) 297-2122

WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (312) 321-6802
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

DIN	Deutsches Institut fur Normung e.V. www.din.de	49 30 2601-0
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

COE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://dodssp.daps.dla.mil	(215) 697-6257
DOE	Department of Energy www.energy.gov	(202) 586-9220

EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Buildings Service (See GSA)	
PHS	Office of Public Health and Science http://www.hhs.gov/ophs/	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USP	U.S. Pharmacopeia www.usp.org	(800) 227-8772
USPS	Postal Service www.usps.com	(202) 268-2000

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
DSCC	Defense Supply Center Columbus (See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil/	(215) 697-2664
	Available from Defense Standardization Program www.dsp.dla.mil	
	Available from General Services Administration www.gsa.gov	(202) 619-8925
	Available from National Institute of Building Sciences www.wbdg.org/ccb	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation www.dca.ca.gov/bhfti	(800) 952-5210 (916) 574-2041
CCR	California Code of Regulations www.calregs.com	(916) 323-6815
CDHS	California Department of Health Services www.dhcs.ca.gov	(916) 445-4171
CDPH	California Department of Public Health, Indoor Air Quality Section www.cal-iaq.org	
CPUC	California Public Utilities Commission www.cpuc.ca.gov	(415) 703-2782
TFS	Texas Forest Service Forest Resource Development http://txforestservice.tamu.edu	 (979) 458-6606

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.

E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste handling procedures.
5. Other dust-control measures.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing with wind screen; minimum 8 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized-steel bases for supporting posts; provide sandbags as required for support.

B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

C. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.

D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures".

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to private system indicated as directed by authorities having jurisdiction.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. Install lighting for Project identification sign.

I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.

1. Provide additional telephone lines for the following:

a. Provide a dedicated telephone line for each facsimile machine in each field office.

2. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.

a. Location on Campus to be determined by Owner.

2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

G. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. Temporary Elevator Use: See Section 14 21 00 "Electric Traction Elevators," Section 14 21 13 "Electric Traction Freight Elevators," Section 14 24 00 "Hydraulic Elevators," Section 14 24 13 "Hydraulic Freight Elevators," and Section 14 26 00 "Limited-Use/Limited-Application Elevators" for temporary use of new elevators.

J. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

1. Do not load elevators beyond their rated weight capacity.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

L. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 01 10 00 "Summary."

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

G. Site Enclosure Fence: Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

K. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.

1. Construct covered walkways using scaffold or shoring framing.
2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
3. Paint and maintain appearance of walkway for duration of the Work.

L. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

M. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

1. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.

    a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.

2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
3. Insulate partitions to control noise transmission to occupied areas.
4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
5. Protect air-handling equipment.
6. Provide walk-off mats at each entrance through temporary partition.

N. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.

c. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 01 23 00 "Alternates" for products selected under an alternate.
2. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
3. Section 01 42 00 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Installation of the Work.
3. Cutting and patching.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Requirements:

1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Section 02 41 19 "Selective Structure Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

B. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

    a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Fire-suppression systems.
    e. Mechanical systems piping and ducts.
    f. Control systems.
    g. Communication systems.
    h. Fire-detection and -alarm systems.
    i. Conveying systems.
    j. Electrical wiring systems.
    k. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

    a. Water, moisture, or vapor barriers.
    b. Membranes and flashings.

c. Exterior curtain-wall construction.
d. Sprayed fire-resistive material.
e. Equipment supports.
f. Piping, ductwork, vessels, and equipment.
g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.

3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

B. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 01 73 00 "Execution" for progress cleaning of Project site.
2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
4. Section 01 79 00 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by . Label with manufacturer's name and model number where applicable.
5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architectwill either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architectwill either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas firstand proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.

d. Name of Contractor.
e. Page number.

4. Submit list of incomplete items in the following format:

a. MS Excel electronic file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.

p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

B. Related Requirements:

1. Section "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect and Commissioning Authority will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Authority will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.

1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.

9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared record Drawings in Section 01 78 39 "Project Record Documents."

G. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit PDF electronic files of scanned record prints and one of file prints.
2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit PDF electronic files of scanned record prints and set(s) of prints.
2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report monthly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 ELECTRONIC CLOSEOUT DOCUMENTATION

A. General: Provide a complete project closeout documentation package in electronic format. This package shall include:
1. Issued for Construction Plans, Specs
2. Project Record Documents.
3. Approved Submittals.
4. Operation and Maintenance Manuals.
5. Warranties.
6. Owner training Videos (.WMV or .MP4 Format)
7. Project Contact Directory.

B. The Electronic Closeout Documentation shall be prepared by BHFX Imaging. GCs / CMs are responsible for the Closeout Fee. Please contact Sarah Jacobs at 847-593-3161 x. 206 or sarah.jacobs@bhfx.net for Pricing and Closeout Organization Information.

C. In order to facilitate the Electronic Closeout Documentation process, comply with the following procedures:
1. Contact BHFX Imaging for a Project Order Form a minimum of three months prior to the date of Substantial Completion to schedule a pre-closeout meeting. Review the following:
    a. Format of documents: PDF electronic format for all documents.
    b. Folder structure for storage and transfer of files.
    c. Schedule for collection and turn-over of closeout documentation.
    d. Record Document format procedures: Provide clean and accurate paper copies of the marked-up Record Documents (Drawings and Specifications) for scanning.
    e. Provide contact information for the individual responsible for the collection and transfer of the Electronic Closeout Documentation Package contents.
    f. Review a complete listing of Electronic Closeout Documentation Package contents.
2. Provide all documentation to BHFX Imaging for processing no later than 30 days after the date of Substantial Completion.
3. Schedule a training conference with the Owner's Representative, Architect, Construction Manager and BHFX Imaging to present the completed Electronic Closeout Documentation Package.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding archive photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.

4. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 01 33 00 "Submittal Procedures" for requirements related to use of Architect's digital data files.
    b. Architect will provide data file layer information. Record markups in separate layers.

C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

D. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Format: Annotated PDF electronic file with comment function enabled.
2. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
3. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section Includes:

1. Demolition and removal of selected portions of exterior or interior of building or structure and site elements.

B. Related Requirements:

1. Section 01 10 00 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 73 00 "Execution" for cutting and patching procedures.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner as indicated.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage; prepare for reuse; and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.5 INFORMATIONAL SUBMITTALS

A. Survey of Existing Conditions: Submit survey.

B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Temporary interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

D. Predemolition Photograph or Video: Submit before work begins.

E. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:

a. Loose furniture, fixtures, and equipment.
b. Artwork and wall decor the Owner would like to salvage.
c. Computers and Office Furniture.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials:

1. It is not expected that hazardous materials will be encountered in the Work.

a. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. On-site sale of removed items or materials is not permitted.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

1. Owner to confirm if any existing warranties are applicable prioer to construction commencement.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video, measured drawings and templates.

1. Inventory and record the condition of items to be removed for salvage or reinstallation. Photograph or video conditions that might be misconstrued as damage caused by removal.
2. Photograph or video existing conditions of adjoining construction including finish surfaces, that might be misconstrued as damage caused by selective demolition operations or removal of items for salvage or reinstallation.

3.2 PREPARATION

A. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

B. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.3 UTILITY SERVICES AND BUILDING SYSTEMS

A. Existing Services/Systems to Remain: Maintain utilities and building systems and equipment to remain and protect against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utilities and building systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated utilities when requested by Contractor.

2. If disconnection of utilities and building systems will affect adjacent occupied parts of the building, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to those parts of the building.
3. Demolish and remove existing building systems, equipment, and components indicated on Drawings to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment and components.

4. Abandon existing building systems, equipment, and components indicated on Drawings to be abandoned in place.

    a. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    b. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

5. Remove and reinstall/salvage existing building systems, equipment, and components indicated on drawings to be removed and reinstalled or removed and salvaged:

    a. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment and components; when appropriate, reinstall, reconnect, and make equipment operational.
    b. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and components and deliver to Owner.

3.4 SALVAGE/REINSTALL

A. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area on-site designated by Owner.
5. Protect items from damage during transport and storage.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete:

1. Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive in accordance with recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood blocking and nailers.
2. Plywood backing panels.

B. Related Requirements:

1. Section 06 16 00 "Sheathing" for sheathing, subflooring, and underlayment.

1.2 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

F. Lumber grading agencies, and abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. SPIB: The Southern Pine Inspection Bureau.
4. WCLIB: West Coast Lumber Inspection Bureau.
5. WWPA: Western Wood Products Association.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
4. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber:

1. Boards: 15 percent.
2. Dimension Lumber: 15 percent for 2-inch nominal thickness or less; no limit for more than 2-inch nominal thickness unless otherwise indicated.
3. Timber. No limit.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 PRESERVATIVE TREATMENT

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT TREATMENT

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664 and design value adjustment factors shall be calculated according to ASTM D6841.

C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings, and the following:

1. Framing for raised platforms.
2. Concealed blocking.
3. Framing for non-load-bearing partitions.
4. Framing for non-load-bearing exterior walls.
5. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Furring.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

C. Concealed Boards: 15 percent maximum moisture content and [any of]the following species and grades:

1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged , fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or ASTM F2329 .
2. For pressure-preservative-treated wood, use stainless steel fasteners.
3. For redwood, use stainless steel fasteners.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.7 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

B. Adhesives for Gluing Furring to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

E. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.

F. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

H. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. ICC-ES evaluation report for fastener.

J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

K. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for[screeding or] attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 00

SECTION 06 41 16 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Miscellaneous materials.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2. Section 12 36 23.13 "Plastic-Laminate-Clad Countertops."

1.2 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

B. Hardware Coordination: Distribute copies of approved hardware schedule specified in to manufacturer of architectural cabinets; coordinate Shop Drawings and fabrication with hardware requirements.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Miscellaneous materials.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Show large-scale details.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.

C. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.

    a. Provide one sample applied to core material with specified edge material applied to one edge.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: Manufacturer of products.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

A. Environmental Limitations with Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

    1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 SOURCE CONTROL

A. Provide plastic-laminate-clad architectural cabinets, plastic-laminate-clad lockers, and plastic-laminate-clad countertops from single fabricator.

2.2 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

B. Architectural Woodwork Standards Grade: Premium.

C. Type of Construction: Frameless.

D. Door and Drawer-Front Style: Flush overlay.

E. High-Pressure Decorative Laminate: ISO 4586-3, grades as indicated or if not indicated, as required by quality standard.

1. See "Millwork Finish Types" Legend on Drawings for product information.

F. Exposed Surfaces:

1. Plastic-Laminate Grade: HGS .
2. Edges: PVC T-mold matching laminate in color, pattern, and finish .
3. Pattern Direction: As indicated.

G. Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Thermally fused laminate panels.

a. Edges of Plastic-Laminate Shelves: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish.
b. Edges of Thermally Fused Laminate Panel Shelves: PVC or polyester edge banding.
c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, ISO 4586-3, grade to match exposed surface.

2. Drawer Sides and Backs: Thermally fused laminate panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermally fused laminate panels.

H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, ISO 4583-3, grade to match exposed surface.

I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
2. Particleboard (Medium Density): ANSI A208.1, Grade M-2-Exterior Glue.
3. Softwood Plywood: DOC PS 1, medium-density overlay.
4. Thermally Fused Laminate (TFL) Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of ISO 4586.

2.4 CABINET HARDWARE AND ACCESSORIES

A. Cabinet Hardware: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 00 "Door Hardware."

B. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 135 degrees of opening.

C. Back-Mounted Pulls: ANSI/BHMA A156.9, B02011.

D. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.

E. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.

F. Drawer Slides: ANSI/BHMA A156.9.

1. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mount .

a. Type: Full overtravel extension.
b. Material: Zinc-plated ball bearing slides.
c. Motion Feature: Soft close dampener.

2. General-purpose drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide grade 1HD-100.
3. File drawers more than 6 inches high or more than 24 inches wide, provide 1HD-200.

G. Door Locks: ANSI/BHMA A156.11, E07121.

H. Drawer Locks: ANSI/BHMA A156.11, E07041.

I. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.

J. Grommets for Cable Passage: 2-1/2 inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Basis-of-Design: Doug Mockett & Company, Inc.; EDP series.
2. Color: Black.

K. Metal Reveal: 1/4-inch by 1/2-inch; color: Black.

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.5 SUPPORT BRACKETS

A. Surface-Mounted Brackets: Provide one of the following manufacturers, in bracket size recommended by manufacturer for depth of component to be supported, and in color indicated on Drawings:

1. A&M Hardware; Regular bracket.
2. Hafele; Work Surface bracket.
3. Federal Brace; Arrowhead Countertop bracket.
4. www.supportbrackets.com.

B. In-Wall (Concealed) Brackets: Provide one of the following manufacturers, in bracket size recommended by manufacturer for depth of component to be supported, and in color indicated on Drawings:

1. A&M Hardware; Concealed Work Station bracket.
2. Rangine Corp.; www.racks.com; EH series bracket, inside wall/flush mount.

2.6 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Type I, waterproof type as selected by fabricator to comply with requirements.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.7 FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.

B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

D. Install glass to comply with applicable requirements in Section 08 80 00 "Glazing" and in GANA's "Glazing Manual."

1. For glass in frames, secure glass with removable stops.
2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.

B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.

C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.

1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips and No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 06 41 16

SECTION 06 42 16 - FLUSH WOOD PANELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Flush wood paneling (wood-veneer wall surfacing) (WD-2).
2. Solid Wood Paneling (WD-1 and 3).
3. Fire-retardant-treated materials.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing paneling that is concealed within other construction before paneling installation.

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that paneling can be installed as indicated.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings: For flush wood paneling.

1. Include plans, elevations, sections, and attachment details.
2. Show details full size.
3. Show locations and sizes of furring and blocking, including concealed blocking specified in other Sections.
4. For paneling produced from premanufactured sets, show finished panel sizes, set numbers, sequence numbers within sets, and method of cutting panels to produce indicated sizes.
5. For paneling veneered in fabrication shop, show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.

C. Samples: For each exposed product and for each color and finish specified, in manufacturer's or fabricator's standard size.

D. Samples for Verification: For the following:

1. Lumber for Transparent Finish: Not less than 5 inches wide by 12 inches long, for each species and cut, finished on one side and one edge.
2. Veneer-Faced Panel Products for Transparent Finish: 8 by 10 inches, for each species and cut. Include at least one face-veneer seam and finish as specified.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of products.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver paneling until painting and similar operations that might damage paneling have been completed in installation areas. Store paneling in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

A. Environmental Limitations with Humidity Control: Do not deliver or install paneling until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

B. Field Measurements: Where paneling is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support paneling by field measurements before being enclosed/concealed by construction and indicate measurements on Shop Drawings.

C. Established Dimensions: Where paneling is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PANELING, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of flush wood paneling (wood-veneer wall surfacing) indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain requirements that are more stringent than the referenced woodwork quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

2.2 FLUSH WOOD PANELING (WOOD-VENEER WALL SURFACING) (WD-2)

A. Grade: Premium .

B. Wood Species and Cut: White oak, rift sliced. Stained to match Architects Sample; Color Dark

C. Veneer Matching Method:

1. Adjacent Veneer Leaves: Book match.
2. Within Panel Face: Running match.

D. Panel-Matching Method:

1. Made-to-order, sequence-matched panels within each separate area.

E. Panel Core Construction: Fire-retardant particleboard or fire-retardant MDF.

1. Thickness: As indicated on Drawings.

F. Exposed Panel Edges: Inset solid-wood or wood-veneer matching faces .

G. Panel Reveals: As Indicated on drawings.

H. Fire-Retardant-Treated Paneling: Panels shall consist of wood-veneer and fire-retardant particleboard or fire-retardant, medium-density fiberboard (MDF). Panels shall have a flame-spread index of 25 or less and a smoke-developed index of 450 or less per ASTM E84, and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

I. Assemble panels by gluing and concealed fastening.

2.3 FLUSH WOOD PANELING (SOLID WOOD WALL SURFACING) (WD-1 and 3)

A. Grade: Premium.

B. Wood Species and Cut:

1. WD-1: White Oak, Rift Cut.

a. Size as indicated on drawings.

b. Stained to match Architect's sample; Color Dark.

2. WD-3: White Oak, Rift Cut.

a. Size as indicated on drawings.

b. Stained to match Architect's sample; Color Natural.

2.4 MATERIALS

A. Materials, General: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.

B. Wood Moisture Content: 5 to 10 percent.

C. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.

1. MDF: ANSI A208.2, Grade 130.

D. Adhesives: Do not use adhesives that contain urea formaldehyde.

2.5 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.

4. Mill lumber before treatment and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of paneling.

C. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Panel Source International, Inc.; Pyroblock Platinum
b. SierraPine; Medite FR.

2.6 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls.

C. Installation Adhesive: Product recommended by panel fabricator for each substrate for secure anchorage.

2.7 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Complete fabrication, including assembly, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times paneling fabrication will be complete.

C. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.8 SHOP FINISHING

A. General: Finish paneling at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.

B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing paneling, as applicable to each unit of work.

C. Transparent Finish:

1. Grade: Same as item to be finished.
2. Finish: System - 5, conversion varnish .
3. Wash Coat for Closed-Grain Woods: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
4. Staining: Match Architect's sample.
5. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
6. Sheen: Satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D523.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition paneling to humidity conditions in installation areas.

B. Before installing paneling, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install paneling to comply with quality standard grade of paneling to be installed.

B. Install paneling level, plumb, true in line, and without distortion. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches. Install with no more than 1/16 inch in 96-inch vertical cup or bow and 1/8 inch in 96-inch horizontal variation from a true plane.

1. For flush paneling with revealed joints, install with variations in reveal width, alignment of top and bottom edges, and flushness between adjacent panels not exceeding 1/32 inch.

C. Anchor paneling to supporting substrate with concealed panel-hanger clips.

1. Do not use face fastening unless covered by trim.

D. Complete finishing work specified in this Section to extent not completed at shop or before installation of paneling. Fill nail holes with matching filler where exposed.

1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective paneling, where possible, to eliminate defects. Where not possible to repair, replace paneling. Adjust for uniform appearance.

B. Clean paneling on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06 42 16

SECTION 07 81 00 - APPLIED FIRE PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Sprayed fire-resistive materials.

1.2 DEFINITIONS

A. SFRM: Sprayed fire-resistive materials.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Framing plans or schedules, or both, indicating the following:

1. Extent of applied fire protection for each construction and fire-resistance rating.
2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
3. Minimum applied fire protection material thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
4. Treatment of sprayed fire-resistive material after application.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of applied fire protection material for tests performed by a qualified testing agency.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by applied fire protection material manufacturer as experienced and with sufficient trained staff to install manufacturer's products in accordance with specified requirements.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not apply applied fire protection when ambient or substrate temperature is 44 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of fire protection, providing complete air exchanges in accordance with manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fire protection dries thoroughly.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain applied fire protection for each fire-resistance design from single source.

2.2 PERFORMANCE REQUIREMENTS

A. Assemblies: Provide applied fire protection, including auxiliary materials, in accordance with requirements of each fire-resistance design and manufacturer's written instructions.

B. Fire-Resistance Design: Indicated on Drawings, tested in accordance with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Steel members are to be considered unrestrained unless specifically noted otherwise.

C. VOC Content: For field applications, coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Primers, Sealers, and Undercoaters: 100 g/L.

D. Low-Emitting Materials: For field applications, coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Asbestos: Provide products containing no detectable asbestos.

2.3 SPRAYED FIRE-RESISTIVE MATERIALS

A. Sprayed Fire-Resistive Material: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application or conveyed in a dry state and mixed with atomized water at place of application.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. GCP Applied Technologies Inc.; Monokote Z146
b. Isolatek International.; Fendolite M-II
c. Southwest Fireproofing Products Co.; Type 7HD

2. Bond Strength: Minimum 430-lbf/sq. ft. cohesive and adhesive strength based on field testing in accordance with ASTM E736/E736M.
3. Density: Not less than density specified in the approved fire-resistance design, in accordance with ASTM E605/E605M.

4. Thickness: As required for fire-resistance design indicated, measured in accordance with requirements of fire-resistance design or ASTM E605/E605M, whichever is thicker, but not less than 0.375 inch.
5. Combustion Characteristics: ASTM E136.
6. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

    a. Flame-Spread Index: 10 or less.
    b. Smoke-Developed Index: 10 or less.

7. Corrosion Resistance: No evidence of corrosion in accordance with ASTM E937/E937M.
8. Deflection: No cracking, spalling, or delamination in accordance with ASTM E759/E759.
9. Effect of Impact on Bonding: No cracking, spalling, or delamination in accordance with ASTM E760/E760M.
10. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours in accordance with ASTM E859/E859M.
11. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G21 or rating of 10 in accordance with ASTM D3274 when tested in accordance with ASTM D3273.
12. Finish: Spray-textured finish. Apply separate, colored topcoat after finishing.

    a. Color: As selected by Architect from manufacturer's full range.

2.4 AUXILIARY MATERIALS

A. Provide auxiliary materials that are compatible with sprayed fire-resistive material and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.

B. Substrate Primers: Primers approved in writing by sprayed fire-resistive material manufacturer and complying with one or both of the following requirements:

1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
2. Primer's bond strength in required fire-resistance design complies with specified bond strength for sprayed fire-resistive material and with requirements in UL's "Product iQ" online directory or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests in accordance with ASTM E736/E736M.

C. Bonding Agent: Product approved in writing by sprayed fire-resistive material manufacturer and complying with requirements in UL's "Product iQ" online directory or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.

D. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by sprayed fire-resistive material manufacturer.

E. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by sprayed fire-resistive material manufacturer. Include pins and attachment.

F. Sealer: Transparent-drying, water-dispersible, tinted protective coating recommended in writing by sprayed fire-resistive material manufacturer for each fire-resistance design.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and in accordance with each fire-resistance design.

1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of applied fire protection with substrates under conditions of normal use or fire exposure.
2. Verify that objects penetrating applied fire protection, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
3. Verify that substrates receiving applied fire protection are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fire protection application.

B. Verify that concrete work on steel deck is complete before beginning Work.

C. Verify that roof construction, installation of rooftop HVAC equipment, and other related work are complete before beginning Work.

D. Conduct tests in accordance with sprayed fire-resistive material manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.

E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cover other work subject to damage from fallout or overspray of applied fire protection materials during application.

B. Clean substrates of substances that could impair bond of applied fire protection.

C. Prime substrates where included in fire-resistance design and where recommended in writing by sprayed fire-resistive material manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive applied fire protection.

D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of applied fire protection. Remove minor projections and fill voids that would telegraph through applied fire protection after application.

3.3 APPLICATION

A. Construct applied fire protection assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting applied fire protection Work.

B. Comply with sprayed fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fire protection; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

C. Coordinate application of fire protection with other construction to minimize need to cut or remove applied fire protection.

1. Do not begin applying fire protection until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
2. Defer installing ducts, piping, and other items that would interfere with applying fire protection until application of fire protection is completed.

D. Metal Decks:

1. Do not apply fire protection to underside of metal deck substrates until concrete topping, if any, is completed.
2. Do not apply fire protection to underside of metal roof deck until roofing is completed; prohibit roof traffic during application and drying of fire protection.

E. Install auxiliary materials as required, as detailed, and in accordance with fire-resistance design and sprayed fire-resistive material manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by sprayed fire-resistive material manufacturer.

F. Spray apply fire protection to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by sprayed fire-resistive material manufacturer.

G. Extend applied fire protection in full thickness over entire area of each substrate to be protected.

H. Install body of applied fire protection in a single course unless otherwise recommended in writing by sprayed fire-resistive material manufacturer.

I. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply fire protection that differs in color from that of encapsulant over which it is applied.

J. Where sealers are used, apply products that are tinted to differentiate them from applied fire protection over which they are applied.

K. Provide a uniform finish complying with description indicated for each type of applied fire protection material and matching finish approved for required mockups.

L. Cure applied fire protection in accordance with sprayed fire-resistive material manufacturer's written instructions.

M. Do not install enclosing or concealing construction until after applied fire protection has been inspected, tested, and corrections have been made to deficient applications.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:

1. Test and inspect as required by the IBC, Subsection 1705.15, "Sprayed Fire-Resistant Materials."

B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fire protection for the next area until test results for previously completed applications of fire protection show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.

C. Applied fire protection will be considered defective if it does not pass tests and inspections.

1. Remove and replace applied fire protection that does not pass tests and inspections, and retest.
2. Apply additional applied fire protection, in accordance with manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

D. Prepare test and inspection reports.

3.5 CLEANING

A. Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

3.6 PROTECTION

A. Protect applied fire protection from damage resulting from construction operations or other causes in accordance with manufacturer's and Installer's written instructions, so applied fire protection is without damage or deterioration at time of Substantial Completion.

3.7 REPAIRS

A. As installation of other adjacent construction proceeds, inspect applied fire protection and repair damaged areas due to work of other trades before concealing it with other construction.

B. Repair applied fire protection using same method and materials as original installation or using manufacturer's recommended trowel-applied repair product.

END OF SECTION 07 81 00

SECTION 07 84 43 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated construction.

B. Related Requirements:

1. Section 09 22 16 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Unlisted Firestopping Systems: Obtain an Engineering Judgment (EJ) from firestop manufacturer where no UL, FM Approvals, or other listed assembly is available for particular firestop configuration. Follow International Firestop Council (IFC) recommended guidelines for evaluating firestop systems in EJs.

C. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an EJ or equivalent fire-resistance-rated assembly developed in accordance with current IFC guidelines.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Listed System Designs: For each joint firestopping system, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written installation instructions.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approvals in accordance with FM Approvals 4991 or been evaluated by UL and found to comply with UL's "UL Solutions Qualified Firestop Contractor Program."

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure joint firestopping systems in accordance with manufacturer's written installation instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of joints to ensure that joint firestopping systems can be installed in accordance with specified firestopping system design.

B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain joint firestop systems for each type of joint opening indicated from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. A qualified testing agency, acceptable to authorities having jurisdiction, will perform joint firestopping system tests.
2. Test in accordance with testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Joint firestop systems installed with products bearing the classification marking of a qualified product certification agency in accordance with listed system designs published by a qualified testing agency.

1) UL in its online directory "Product iQ."

2.3 JOINT FIRESTOPPING SYSTEM TYPES

A. General: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems must accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

1. Joint firestopping systems that are compatible with one another, with the substrates forming openings, and with penetrating items, if any.
2. Provide products that, upon curing, do not re-emulsify, dissolve, leach, break down, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture.
3. Provide firestop products that do not contain ethylene glycol.

B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined in accordance with ASTM E1966 or UL 2079, with published L-Ratings for ambient and elevated temperatures as evidence of the ability of the fire-resistive joint system to restrict the movement of smoke.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. 3M Building and Construction.
    b. Hilti, Inc.
    c. Owens Corning.
    d. Tremco Incorporated.

2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.

C. Joints in Smoke Barriers: Provide joint firestopping systems with ratings determined in accordance with UL 2079 based on testing at a positive pressure differential of 0.30 inch wg.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. 3M Building and Construction.
    b. Hilti, Inc.
    c. Owens Corning.
    d. Tremco Incorporated.
    e. <Insert manufacturer's name>.

2. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.

D. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined in accordance with ASTM E84.

2.4 ACCESSORIES

A. Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing joint firestopping systems, clean joints in accordance with fire-resistive joint system manufacturer's written installation instructions and the following requirements:

1. Remove foreign materials from substrate surfaces that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates in accordance with joint firestopping system manufacturer's written installation instructions, using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Apply a suitable bond breaker to prevent three-sided adhesion in applications where condition occurs.

3.3 INSTALLATION

A. General: Install joint firestopping systems in accordance with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

C. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:

1. Apply elastomeric fill in voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 ft. from end of wall and at intervals not exceeding 30 ft..

B. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge, so labels are visible to anyone seeking to remove joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections in accordance with ASTM E2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's online directory "Product iQ" under product Category XHBN or Category XHDG.

B. Head-of-Wall, Fire-Resistive Joint Firestopping Systems: .

1. UL-Classified Systems: HW-D -0000-0999.
2. Assembly Rating: As Indicated on Drawings.
3. Nominal Joint Width: As indicated.

C. Bottom-of-Wall, Joint Firestopping Systems: .

1. UL-Classified Systems: BW-S-0000-0999.
2. Assembly Rating: As Indicated on Drawings.
3. Nominal Joint Width: As indicated.

D. Perimeter Joint Firestopping Systems: .

1. UL-Classified Perimeter Fire-Containment Systems: CW-D -0000-0999.
2. Integrity Rating: As Indicated on Drawings.
3. Insulation Rating: As Indicated on Drawings.
4. Linear Opening Width: As indicated, maximum.

END OF SECTION 07 84 43

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nonstaining silicone joint sealants.
2. Mildew-resistant joint sealants.
3. Latex joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Nonstaining silicone joint sealants.
2. Mildew-resistant joint sealants.
3. Latex joint sealants.

B. Samples for Initial Selection: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

B. Preconstruction Laboratory Test Reports: For each joint sealant and substrate material to be tested from sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

C. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

D. Field Quality-Control Reports: For field-adhesion-test reports, for each sealant application tested.

1.4 CLOSEOUT SUBMITTALS

A. Manufacturers' special warranties.

B. Installer's special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

1.6 MOCKUPS

A. Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with masonry substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.

7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
5. Test Method: Test joint sealants in accordance with Method A, Tail Procedure, in ASTM C1521.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

6. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
7. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.8 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.9 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. GE Construction Sealants; Momentive Performance Materials Inc.; SilPruf NB.
b. Pecora Corporation.; 895NST.
c. Sika Corporation.; Bondaflex Sil 295 FPS NB.
d. The Dow Chemical Company.; 795
e. Tremco Incorporated.; Spectrem 3.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
   b. May National Associates, Inc.; a subsidiary of Sika Corporation U.S.; Bondaflex Sil 100 WF.
   c. Tremco Incorporated.; Tremsil 200.

2.5 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. BASF Construction Chemicals - Building Systems; Sonolac.
   b. Pecora Corporation.; AC-20
   c. Tremco Incorporated.; Tremflex 834.

2.6 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests and Inspections:

1. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

a. Extent of Testing: Test completed and cured sealant joints as follows:

1) Perform 10 tests for the first 1000 ft. of joint length for each kind of sealant and joint substrate.
2) Perform one test for each 1000 ft. of joint length thereafter or one test per each floor per elevation.

b. Test Method: Test joint sealants in accordance with Method A, Tail Procedure, in ASTM C1521.

1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

c. Inspect tested joints and report on the following:

1) Whether sealants filled joint cavities and are free of voids.
2) Whether sealant dimensions and configurations comply with specified requirements.
3) Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

d. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.

e. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

2. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

C. Prepare test and inspection reports.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Joints between plant-precast architectural concrete units.
    b. Control and expansion joints in unit masonry.
    c. Joints between metal panels.
    d. Joints between different materials listed above.
    e. Perimeter joints between materials listed above and frames of doors and windows.
    f. Control and expansion joints in ceilings and other overhead surfaces.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:

    a. Control joints on exposed interior surfaces of exterior walls.
    b. Perimeter joints between interior wall surfaces and frames of interior doors,windows and elevator entrances.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 92 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Section Includes hollow-metal work.

B. Related Requirements:

1. Section 08 14 16 "Flush Wood Doors" for wood doors.
2. Section 08 71 00 "Door Hardware" for door hardware for doors.
3. Section 08 80 00 "Glazing" for glazing within hollow metal frames.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.3 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 ACTION SUBMITTALS

A. Product Data Submittals: For each product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:

1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
2. Locations of reinforcement and preparations for hardware.
3. Details of each different wall opening condition.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly fire-rated borrowed-lite assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.

B. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.

C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.7 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies is to meet the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies is to meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 HOLLOW METAL DOORS AND FRAMES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ceco Door; AADG, Inc.; ASSA ABLOY.
2. Curries, AADG, Inc.; ASSA ABLOY Group.
3. LaForce, LLC.
4. Philipp Manufacturing Co (The).
5. Premier Products, Inc.
6. Republic Doors and Frames; a Allegion brand.
7. Steelcraft; Allegion plc.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing in accordance with NFPA 257 or UL 9.

C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.40 deg Btu/F x h x sq. ft. when tested in accordance with ASTM C1363 or ASTM E1423.

2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. Provide at all locations unless noted otherwise.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule on Drawings.
b. Thickness: 1-3/4 inches.
c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch.
d. Edge Construction: Model 1, Full Flush.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Core: Manufacturer's standard .
g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
c. Construction: Full profile welded.

3. Exposed Finish: Prime.

C. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. Provide at stairwells; toilet rooms; Janitorial and Storage rooms; and mechanical rooms.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule on Drawings.
b. Thickness: 1-3/4 inches.
c. Face: Uncoated steel sheet, minimum thickness of 0.053 inch.
d. Edge Construction: Model 1, Full Flush.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Core: Manufacturer's standard .
g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors.

2. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
c. Construction: Face welded.

3. Exposed Finish: Prime.

2.4 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.5 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

D. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

E. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

F. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

2.6 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.7 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
b. Install frames with removable stops located on secure side of opening.

2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
3. Floor Anchors: Secure with postinstalled expansion anchors.

a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

4. Solidly pack mineral-fiber insulation inside frames.
5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.
3. Smoke-Control Doors: Install doors in accordance with NFPA 105.

D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 08 11 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core five-ply flush wood veneer-faced doors for transparent finish.
2. Light frames and louvers.

B. Related Requirements:

1. Section 08 80 00 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Solid-core five-ply flush wood veneer-faced doors for transparent finish.
2. Light frames and louvers.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of frame for each frame type, including dimensions and profile.
4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Doors to be factory finished and application requirements.

C. Samples for Initial Selection: For plastic-laminate door faces factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
2. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Special warranties.

1.5 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of veneer.
b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty also includes installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.3 FLUSH WOOD DOORS AND FRAMES, GENERAL

A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

1. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.4 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Doors, Solid-Core Five-Ply Veneer-Faced :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Algoma Hardwoods, Inc.
b. Eggers Industries.
c. Graham Wood Doors.

d. Marshfield Door Systems, Inc.
e. VT Industries, Inc.

2. Performance Grade by Location:

   a. ANSI/WDMA I.S. 1A Extra Heavy Duty: Classrooms, public toilets, janitor's closets, mechanical and storage rooms, assembly spaces, and exits .
   b. ANSI/WDMA I.S. 1A Heavy Duty: All other locations.

3. ANSI/WDMA I.S. 1A Quality Grade: Custom.
4. Faces: Single-ply wood veneer not less than 1/50 inch thick.

   a. Species: White oak.
   b. Cut: Rift cut.
   c. Match between Veneer Leaves: Book match.
   d. Assembly of Veneer Leaves on Door Faces: Running match.
   e. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
   f. Room Match:

      1) Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 20 feet or more.

   g. Transom Match: Continuous match.

5. Exposed Vertical and Top Edges: Applied wood edges of same species as faces and covering edges of crossbands - Architectural Woodwork Standards edge Type D.

   a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
   b. Fire-Rated Pairs of Doors:

      1) Provide formed-steel edges and astragals with intumescent seals.

         a) Finish steel edges and astragals with baked enamel same color as doors.

   c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

      1) Screw-Holding Capability: 550 lbf in accordance with WDMA T.M. 10.

6. Core for Non-Fire-Rated Doors:

   a. WDMA I.S. 10 structural composite lumber.

      1) Screw Withdrawal, Door Face: 550 lbf.
      2) Screw Withdrawal, Vertical Door Edge: 400 lbf.

7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.

    a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.

8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces .
2. Profile: Recessed tapered beads .
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated on Drawings. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.

1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Transom and Side Panels:

1. Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.

2. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
3. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails.
4. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

D. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."

2.7 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:

1. ANSI/WDMA I.S. 1A Grade: Custom.

a. TR-6 Catalyzed Polyurethane.

2. Staining: Match Architect's sample .
3. Sheen: Satin .

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 08 71 00 "Door Hardware."

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
2. Anchor frames to anchors or blocking built in or directly attached to substrates.

a. Secure with countersunk, concealed fasteners and blind nailing.
b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

1) For factory-finished items, use filler matching finish of items being installed.

3. Install smoke- and draft-control doors in accordance with NFPA 105.

D. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.

a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.

2. Machine doors for hardware.
3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
4. Clearances:

a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
c. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
d. Comply with NFPA 80 for fire-rated doors.

5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
6. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

F. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 16

SECTION 08 35 13 - FOLDING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-rated folding doors.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Fire-rated folding doors.

B. Shop Drawings:

1. Include plans, elevations, sections, and installation details.
2. Include clearances required for operation, operating and control mechanisms, access requirements, storage pockets and pocket doors, and accessory items.
3. Fire-Release System: Describe system, including testing and resetting instructions for fire-rated folding doors.
4. Include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For folding doors to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of fire-rated folding doors.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install folding doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for building occupants after completion of construction during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 FIRE-RATED FOLDING DOORS

A. Description: Electrically operated folding-door assembly, automatic or self-closing, listed and labeled for fire-resistance ratings indicated by a qualified testing agency, top supported, and complete with hardware, seals, track, closing devices, releasing devices, controls, and accessories necessary for intended operation.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. McKeon Door Company.
2. Won-Door Corporation.

C. Listed Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing according to NFPA 252 or UL 10B.

D. Configuration: Side opening.

E. Features:

1. Track: Overhead track without floor guide.
2. Normal Position: Assembly's normal position is the open (stacked) position. Signal from fire-alarm system initiates self-closing operation.
3. Non-Sway Construction: To resist differential air pressure.

F. Fire Rating: 1-1/2 hour(s).

G. Panel Construction: Formed-galvanized-steel or formed-steel sheet panels connected by hinges of matching material.

H. Perimeter Seals and Closures: Manufacturer's standard vinyl or neoprene vertical seals, horizontal top and bottom seals, and closures identical to products tested for fire rating indicated, and forming an effective smoke and draft seal.

I. Track and Trolley System: Single or dual steel or aluminum track systems, with ball-bearing roller trolleys and adjustable steel hanger rods for overhead support; designed for type of operation, size, and weight of fire-rated folding door indicated. Provide a continuous system of track sections and accessories identical to products tested for fire rating indicated, to accommodate configuration and layout indicated for door operation and storage.

J. Lead Posts: Metal sheet material matching door-panel construction and connected to panels by specially adapted panels and equipped with manufacturer's standard handle on each side.

K. Electric Operators and Controls:

1. Operators: Factory-assembled power-drive unit consisting of motor, remote-located control panel, limit switches, torque-limiting devices, clutch, reversing magnetic motor operator, leading-edge obstruction detectors, and key-switch control for conventional operation.

a. Motor: In horsepower required for proper operation of door height and weight, controlled by reversing magnetic starter and equipped with overload protection.
b. Limit Switches: To prevent overtravel.
c. Roller Chain or Cable: Connected to lead posts by means of vertical stabilizer bar assembly.
d. Drive Mechanism: Protected by torque limiter and emergency clutch.
e. Travel Speed: 18 inches per second, maximum; 6 inches per second, minimum.

2. In case of fire, closing system is activated by building's fire- and smoke-detection equipment and automatically closes fire-rated folding doors.
3. Electrical Service: Equip for 120-V, single-phase, 60-cycle ac.
4. Battery: Electrical current connects through relay to battery charger that continuously charges 12-V dc battery and automatically maintains battery at capacity. Automatic audible signal device sounds off if battery falls below or exceeds proper charge, power loss has occurred, or high-ac line voltage has been experienced.
5. Leading-Edge Obstruction Detector:

a. Equip with pressure-sensitive leading edge that, on contact with an obstruction, causes door to stop and pause before attempting to re-close.

6. Fire-rated folding doors can be manually opened by pushing against leading edge.
7. Audible alarm sounds at automatic closing of door.

L. Accessories:

1. Exit Hardware: Located on both sides of fire-rated folding door. In emergency mode, slight pressure on hardware causes door to open a minimum of 32 inches, pause for three seconds, and then automatically close. Furnish hardware that can be field programmable to allow automatic opening distances of up to the entire opening width. In conventional mode, hardware is used to operate door and move it back into storage pocket.

M. Finishes:

1. Factory-applied polyester or powder-coat finish for panels and hinges in colors as selected by Architect from manufacturer's full range.
2. Manufacturer's standard finish for handles.

N. Pocket Door: Swinging door that closes to conceal the storage pocket.

1. Solid-core pocket doors with reverse-action spring hinge; 90-degree minimum swing.
2. Face Finish: Match adjacent finishes.
3. Magnetic Catch: Holding force of no more than 30 lbf.
4. Maximum Opening Force: 50 lbf.
5. Bumper on interior side of pocket door as required by fire-rated folding-door manufacturer to prevent interference with opening or retracting operation of fire-rated folding door.
6. Coordinate pocket door sizes with fire-rated folding-door manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. For folding doors supported by or anchored to permanent construction, advise installers of specific requirements for placement of anchorage devices. Furnish installers of other work with templates and drawings indicating locations of anchorage devices and similar items.

B. Fire-Rated Folding Doors: Level floor with header in path of fire-rated folding doors to tolerance of plus or minus 1/16 inch across opening; grind or fill floor as necessary.

3.3 INSTALLATION

A. General: Install folding doors complying with manufacturer's written installation instructions. Install track in one piece.

1. Fire-Rated Folding Doors: Comply with NFPA 80 requirements for installation.

B. Standard Floor Clearances: 1/4 to 3/4 inch maximum (above floor finish).

C. Coordinate provisions for sensing devices, electrical service, and final connections for fire-rated folding doors.

3.4 ADJUSTING

A. Adjust units to ensure smooth, quiet operation without warping or binding. Adjust hardware to function smoothly. Confirm that latches engage accurately and securely without forcing or binding.

1. Fire-Rated Folding Doors: Verify that all operations are functional and comply with requirements of authorities having jurisdiction.

B. Pocket Doors: Adjust to operate smoothly and easily, without binding or warping. Adjust hardware to function smoothly. Confirm that latches and locks engage accurately and securely without forcing or binding.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-rated folding doors.

END OF SECTION 08 35 13

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed entrance and storefront systems.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Aluminum-framed entrance and storefront systems.

B. Shop Drawings:

1. Plans, elevations, sections, full-size details, and attachments to other work.
2. Details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
3. Full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrance and storefront systems, showing the following:

    a. Joinery, including concealed welds.
    b. Anchorage.
    c. Expansion provisions.
    d. Glazing.
    e. Flashing and drainage.

4. Connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
5. Point-to-point wiring diagrams showing the following:

    a. Power requirements for each electrically operated door hardware.
    b. Location and types of switches, signal device, conduit sizes, and number and size of wires.

6. Signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Verification: Actual sample of finished products for each type of exposed finish.

1. Size: Manufacturers' standard size.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For aluminum-framed entrance and storefront systems.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in state where Project is located and who is experienced in providing engineering services of the type indicated.

C. Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025 and acceptable to Owner and Architect.

D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Submit to structural glazing sealant manufacturer, for testing indicated below, Samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that is in close proximity to or is touching the structural or nonstructural sealants of a structural glazed system.

1. Compatibility: Test materials or components using ASTM C1087.
2. Adhesion: Test for adhesion or lack of adhesion of a structural sealant to the surface of another material or component using ASTM C1135.
3. Submit no fewer than [eight] <Insert number> pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
6. Testing will not be required if data based on previous testing of current sealant products match those submitted.

1.6 WARRANTY

A. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

    a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
    b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

    a. Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.
    b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
    c. Cracking, peeling, or chipping.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain all components of aluminum-framed entrance and storefront system, including framing spandrel panels and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design aluminum-framed entrance and storefront systems.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrance and storefront systems to withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

    a. Thermal stresses transferring to building structure.
    b. Glass breakage.
    c. Noise or vibration created by wind and thermal and structural movements.

d. Loosening or weakening of fasteners, attachments, and other components.
e. Failure of operating units.

C. Deflection of Framing Members Supporting Glass: At design wind load, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches.
2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
3. Cantilever Deflection: Limited to 2L/175 at unsupported cantilevers.

D. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested in accordance with AAMA 501.5.

a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
b. Low Exterior Ambient-Air Temperature: 0 deg F.
c. Interior Ambient-Air Temperature: 75 deg F.

2.3 ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. EFCO Corporation.
2. Kawneer Company, Inc.; Arconic Corporation.
3. Pittco Architectural Metals, Inc.
4. Tubelite Inc.

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Interior Systems:

a. Profile: 1-3/4 inch by 4-1/2 inch system.
b. Framing Construction: Nonthermal.
c. Glazing System: Retained mechanically with gaskets on four sides .
d. Glazing Plane: Front.
e. Finish: Clear anodic finish.

2. Fabrication Method: Field-fabricated stick system.
3. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
4. Steel Reinforcement: As required by manufacturer.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.4 ENTRANCE DOOR HARDWARE

~~2.~~ Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."

2.5 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

2.6 MATERIALS

A. Sheet and Plate: ASTM B209.

B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.

C. Structural Profiles: ASTM B308/B308M.

D. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

E. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.7 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.

3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system, fabricated from 300 series stainless steel.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials .

D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

E. Rigid PVC filler.

2.8 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior for panes accessible at grade, and panes where interior access is not possible; interior for panes higher than one story above grade.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Storefront Framing: Fabricate components for assembly using screw-spline system.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At interior and exterior doors, provide compression weather stripping at fixed stops.

F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

G. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

A. Comply with manufacturer's written instructions.

B. Do not install damaged components.

C. Fit joints to produce hairline joints free of burrs and distortion.

D. Rigidly secure nonmovement joints.

E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

F. Seal perimeter and other joints watertight unless otherwise indicated.

G. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

H. Set continuous sill members and flashing in full sealant bed, as specified in Section 07 92 00 "Joint Sealants," to produce weathertight installation.

I. Install joint filler behind sealant as recommended by sealant manufacturer.

J. Install components plumb and true in alignment with established lines and grades.

K. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

L. Install entrance doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

M. Install glazing as specified in Section 08 80 00 "Glazing."

3.3 ERECTION TOLERANCES

A. Install aluminum-framed entrance and storefront systems to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:

   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.

4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests.

B. Tests: Perform the following tests on representative areas of aluminum-framed entrance and storefront systems.

C. Inspection Agency: Owner will engage a qualified inspector to perform inspections.

D. Inspections:

1. Egress Door Inspections: Inspect each aluminum-framed entrance door equipped with panic hardware, located in an exit enclosure, electrically controlled, and equipped with special locking arrangements, in accordance with NFPA 101, Ch. 7 "Means of Egress," Section "Means of Egress Components," Article "Inspection of Door Openings."

E. Aluminum-framed entrance and storefront systems will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION 08 41 13

SECTION 08 41 26 - ALL-GLASS ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior all-glass entrance and storefront systems.

1.2 ACTION SUBMITTALS

A. Product Data Submittals: For each product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for all-glass system.

B. Shop Drawings: For exterior all-glass entrance and storefront systems.

1. Plans, elevations, and sections.
2. Details of fittings and glazing, including isometric drawings of fittings.
3. Door hardware locations, mounting heights, and installation requirements.
4. Signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Verification: Actual sample of finished products for each type of fitting, accessory fitting, glass showing exposed edge finish, and door hardware.

1. Size: Manufacturers' standard size.

D. Fabrication Sample: Patch fitting at sill on pivot side only Continuous rail fitting at bottom, made from 12-inch lengths of full-size components and showing details of the following:

1. Joinery.
2. Anchorage.

E. Delegated Design Submittals: For exterior all-glass entrance and storefront systems, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each exterior all-glass entrance and storefront system, for tests performed by manufacturer and witnessed by a qualified testing agency.

B. Sample Warranties: For exterior all-glass entrance and storefront systems.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For exterior all-glass entrance and storefront systems.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Fabricator of products.
2. Entity that employs installers and supervisors who are trained and approved by manufacturer.
3. Authorized representative who is trained and approved by manufacturer.

B. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in state where Project is located and who is experienced in providing engineering services of the type indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of exterior all-glass entrance and storefront systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection.
b. Faulty operation of components.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Period: Two years from date of Substantial Completion.

a. Concealed Floor Closers: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain all components of all-glass entrance and storefront systems, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design exterior all-glass entrance and storefront systems.

B. General Performance: Comply with performance requirements specified, as determined by testing of exterior all-glass entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

C. Structural Loads:

1. Other Design Loads: As indicated on Drawings.
2. Deflection Limits: Deflection normal to glazing plane is limited to 1/175 of clear span or 3/4 inch, whichever is smaller.

D. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.3 ALL-GLASS ENTRANCE AND STOREFRONT SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Blumcraft of Pittsburgh; C.R. Laurence Co., Inc.
2. Oldcastle Building Envelope.
3. Virginia Glass Products Corporation.

B. Fitting Configuration:

1. Manual-Swinging, All-Glass Entrance Doors: Patch fittings at head and sill on pivot side only (A-Style).
2. All-Glass Storefronts: Recessed glazing channel at top and continuous rail fitting at bottom.

C. Fitting Material: Aluminum.

D. Rail Fittings:

1. Height:

a. Top Rail: As indicated.
b. Bottom Rail: 1 inch channel.

2. Profile: Square.
3. End Caps: Manufacturer's standard precision-fit end caps for rail fittings.

E. Accessory Fittings:

1. Overhead doorstop.
2. Center-housing lock.
3. U-channel.

F. Anchors and Fastenings: Concealed.

G. Materials:

1. Stainless Steel Cladding: ASTM A240/A240M or ASTM A666, Type 304.

a. Finish: ASTM A480/480M No. 4 directional satin finish.

2.4 GLASS

A. Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), Quality-Q3, tested for surface and edge compression in accordance with ASTM C1048 and for impact strength in accordance with 16 CFR 1201 for Category II materials.

1. Class 1: Clear monolithic.

a. Thickness: 12 mm.
b. Locations: As indicated.

2. Exposed Edges: Machine ground and flat polished.
3. Butt Edges: Flat ground.
4. Corner Edges: Lap-joint corners with exposed edges polished.

2.5 BUTT-GLAZING GASKET

A. Extruded Silicone Gasket: Designed to reduce sound, smoke, and odors through glass-to-glass (butt) joints.

1. Basis-of-Design: C.R. Laurence Co., Inc.; CRL EZ GLAZE Soundstrip.
2. Size: As required to accommodate glass thickness and gap.

2.6 ENTRANCE DOOR HARDWARE

A. Door Hardware: Refer to Section 08 71 00 Door Hardware Set 10 for additional information.

2.7 BUTT-GLAZING SEALANTS

A. Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, for Uses NT, G, and A.

2.8 FABRICATION

A. Provide holes and cutouts in glass to receive hardware, fittings, and accessory fittings before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.

1. Fully temper glass using horizontal (roller-hearth) process, and fabricate so that when glass is installed, roll-wave distortion is parallel with bottom edge of door or lite.

B. Factory assemble components and factory install hardware and fittings to greatest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ALL-GLASS ENTRANCE AND STOREFRONT SYSTEMS

A. Install all-glass entrance and storefront systems and associated components according to manufacturer's written instructions.

B. Set units level, plumb, and true to line, with uniform joints.

C. Maintain uniform clearances between adjacent components.

D. Lubricate hardware and other moving parts in accordance with manufacturer's written instructions.

E. Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.

F. Install butt-joint sealants according to manufacturer's written instructions and as specified in Section 07 92 00 "Joint Sealants" to produce weathertight installation.

3.3 ADJUSTING AND CLEANING

A. Adjust all-glass entrance doors and hardware to function smoothly and fit tightly at contact points and weather stripping.

1. For all-glass entrance doors accessible to people with disabilities, adjust closers to provide a three-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

B. Remove excess sealant and glazing compounds and dirt from surfaces.

END OF SECTION 08 41 26

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
   a. "Metal Doors and Frames"
   b. "Flush Wood Doors"
   c. "Interior Aluminum Doors and Frames"
   d. "Aluminum-Framed Entrances and Storefronts"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.2 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.3 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
   a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
   b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
   a. Wiring Diagrams: For power, signal, and control wiring and including:
      1) Details of interface of electrified door hardware and building safety and security systems.
      2) Schematic diagram of systems that interface with electrified door hardware.
      3) Point-to-point wiring.
      4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:
    a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
    b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
    c. Indicate complete designations of each item required for each opening, include:
        1) Door Index: door number, heading number, and Architect's hardware set number.
        2) Quantity, type, style, function, size, and finish of each hardware item.
        3) Name and manufacturer of each item.
        4) Fastenings and other pertinent information.
        5) Location of each hardware set cross-referenced to indications on Drawings.
        6) Explanation of all abbreviations, symbols, and codes contained in schedule.
        7) Mounting locations for hardware.
        8) Door and frame sizes and materials.
        9) Degree of door swing and handing.
        10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:
    a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
    b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
    c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
    d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
    e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
    f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
    a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
    b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Final approved hardware schedule edited to reflect conditions as installed.
d. Final keying schedule
e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
   a. Fire door assemblies, in compliance with NFPA 80.
   b. Required egress door assemblies, in compliance with NFPA 101.

1.4 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
   a. For door hardware: DHI certified AHC or DHC.
   b. Can provide installation and technical data to Architect and other related subcontractors.
   c. Can inspect and verify components are in working order upon completion of installation.
   d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
   a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.

b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:
   a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
   b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware
   a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:
   a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
   a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      2) Preliminary key system schematic diagram.
      3) Requirements for key control system.
      4) Requirements for access control.
      5) Address for delivery of keys.

2. Pre-installation Conference
   a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Inspect and discuss preparatory work performed by other trades.
   c. Inspect and discuss electrical roughing-in for electrified door hardware.
   d. Review sequence of operation for each type of electrified door hardware.
   e. Review required testing, inspecting, and certifying procedures.
   f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:
   a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.

C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.6 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.7 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
    a. Mechanical Warranty
        1) Locks
            a) Corbin Russwin ML Series: 10 years

2) Exit Devices
   a) Von Duprin: 3 years
3) Closers
   a) LCN 4000 Series: 30 years
   b) CRL Concealed: 5 years
   b. Electrical Warranty
1) Exit Devices
   a) Von Duprin: 1 year

1.8 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.

C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.2 MATERIALS

A. Fabrication

1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer’s recognized installation standards for application intended.

2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.3 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Ives 5BB series

2. Acceptable Manufacturers and Products:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
   a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
   b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. 2 inches or thicker doors:
   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.

7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.4 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
   a. Von Duprin EPT-10 CON
2. Acceptable Manufacturers and Products:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.5 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Corbin Russwin ML2000 series
2. Acceptable Manufacturers and Products:
   a. Schlage L9000 series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.

4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
7. Provide motor based electrified locksets that comply with the following requirements:
    a. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
    b. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
    c. Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
    d. Low holding current – maximum 0.01 amps to produce minimal heat, eliminate "hot levers" in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
    e. Connections – provide quick-connect Molex system standard.
8. (KEY OVERRIDE OPTION WHEN XL13-439 IS SPECIFIED IN HARDWARE SETS) Provide locks with a key override feature built into the chassis that allows the outside key to retract the deadbolt and/or latchbolt, overriding the inside thumbturn when it is being held in the locked position.
9. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
    a. Provide levers that return to within 1/2 inch (13 mm) of door face.
    b. Vandlgard: Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.
    c. Lever Design: CSA

2.6 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
    a. Von Duprin 98/35A series

2. Acceptable Manufacturers and Products:
    a. No Substitute

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.

5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.7 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Von Duprin 6000 Series

2. Acceptable Manufacturers and Products:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant that are tested to a minimum endurance test of 1,000,000 cycles.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.8 MAGNETIC LOCKS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Security Door Controls

2. Acceptable Manufacturers:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide magnetic locks certified to meet ANSI/BHMA A156.23 classification criteria, UL10C, and UL1034 for burglary-resistant electronic locking mechanisms.
2. Provide magnetic locks equipped with SPDT Magnetic Bond Sensing device, where specified, to monitor whether enough magnetic holding force exists to ensure adequate locking and SPDT Door Status Monitor device, where specified, to monitor whether door is open or closed. Provide bond sensors fully concealed within electromagnet to resist tampering or damage.
3. Provide fasteners, mounting brackets, and spacer bars required for mounting and details.
4. Provide power supply recommended and approved by manufacturer of magnetic locks.
5. Where magnetic locks are scheduled, provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of magnetic locks for each individual leaf. Switches control both doors simultaneously at pairs. Locate controls as directed by Architect.

2.9 PASSIVE INFRARED MOTION SENSORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Security Door Controls MD-31D Series

2. Acceptable Manufacturers and Products:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide motion sensors as specified in hardware groups.

2.10 PUSHBUTTONS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Security Door Controls 410 series

2. Acceptable Manufacturers and Products:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide push buttons as specified in hardware groups.

2.11 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage/Von Duprin PS900 Series

2. Acceptable Manufacturers and Products:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
   a. 12/24 VDC Output, field selectable.
   b. Class 2 Rated power limited output.
   c. Universal 120-240 VAC input.
   d. Low voltage DC, regulated and filtered.
   e. Polarized connector for distribution boards.
   f. Fused primary input.
   g. AC input and DC output monitoring circuit w/LED indicators.
   h. Cover mounted AC Input indication.
   i. Tested and certified to meet UL294.
   j. NEMA 1 enclosure.
   k. Hinged cover w/lock down screws.
   l. High voltage protective cover.

2.12 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer and Product:
   a. Corbin Russwin

2. Acceptable Manufacturers and Products:
   a. No Substitute

B. Requirements:

1. Provide cylinders/cores to match Owner’s existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.

2.13 KEYING

A. Scheduled System:

1. Existing non-factory registered system:
   a. Provide cylinders/cores keyed into Owner's existing keying system managed by Owner's locksmith, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
   a. Replaceable Construction Cores.
   1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
      a) 3 construction control keys
      b) 12 construction change (day) keys.
   2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:
   a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
   1) Master Keying system as directed by the Owner.
   b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
   c. Provide keys with the following features:
   1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
   2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
   d. Identification:
   1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
   2) Identification stamping provisions must be approved by the Architect and Owner.
   3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
   4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
   5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
   e. Quantity: Furnish in the following quantities.
   1) Permanent Control Keys: 3.
   2) Master Keys: 6.
   3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
   4) Key Blanks: Quantity as determined in the keying meeting.

2.14 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. LCN 4040XP series

2. Acceptable Manufacturers and Products:
   a. No Substitute

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter piston with 5/8-inch (16 mm) diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.15 CONCEALED DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. CRL

2. Acceptable Manufacturers and Products:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide concealed door closers at doors conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
2. Provide heavy duty, double-acting closers with single lever arm and roller assembly.
3. Provide closers capable of being mounted in a minimum 1-3/4-inch header.
4. Provide concealed door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
5. Cylinder Body: 1-1/8-inch (29 mm) piston diameter, with 5/8-inch (16 mm) diameter heat-treated pinion journal.
6. Provide all-weather hydraulic fluid, fireproof, passing requirements of UL10C.

7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special template, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.16 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.17 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
   a. Glynn-Johnson

2. Acceptable Manufacturers:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.19 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Substitutions by official Division 01 request only

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.20 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Zero International

2. Acceptable Manufacturers:
   a. Substitutions by official Division 01 request only

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.21 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
2. Protection Plates: BHMA 630 (US32D)

3. Overhead Stops and Holders: BHMA 630 (US32D)
4. Door Closers: Powder Coat to Match
5. Wall Stops: BHMA 630 (US32D)
6. Latch Protectors: BHMA 630 (US32D)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.

C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.

I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.
3. Furnish permanent cores to Owner for installation.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

L. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

M. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

N. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

3.3 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.4 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items per manufacturer's instructions to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.5 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.

C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Hardware Group No. 01

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ML2055 CSA CT6D	626	C-R
1	EA	LFIC PERMANENT CORE	KEYED INTO EXISTING SYSTEM	626	C-R
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
3	EA	DOOR SILENCERS			

Hardware Group No. 02

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ML2055 CSA CT6D	626	C-R
1	EA	LFIC PERMANENT CORE	KEYED INTO EXISTING SYSTEM	626	C-R
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	OH STOP	100S	630	GLY
3	EA	DOOR SILENCERS			

Hardware Group No. 03

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	ML2051 CSA CT6D	626	C-R
1	EA	LFIC PERMANENT CORE	KEYED INTO EXISTING SYSTEM	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
3	EA	DOOR SILENCERS			

Hardware Group No. 04

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	STOREROOM LOCK	ML2057 CSA CT6D	626	C-R
1	EA	LFIC PERMANENT CORE	KEYED INTO EXISTING SYSTEM	626	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
3	EA	DOOR SILENCERS			

Hardware Group No. 05

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	CONST LATCHING BOLT	FB51P/FB61P AS REQ	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2 (AS REQ)	626	IVE
1	EA	STOREROOM LOCK	ML2057 CSA CT6D	626	C-R
1	EA	LFIC PERMANENT CORE	KEYED INTO EXISTING SYSTEM	626	C-R
2	EA	DOOR STOP	100S	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

Hardware Group No. 06

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK W/ IND	ML2030 CSA ML190 V20	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 07

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ML2057 CSA CT6D	626	C-R
1	EA	LFIC PERMANENT CORE	KEYED INTO EXISTING SYSTEM	626	C-R
1	EA	ELECTRIC STRIKE	6211AL FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	CREDENTIAL READER	BY DIVISION 28		B/O
3	EA	DOOR SILENCERS			

CREDENTIAL READER DEVICE IS TO RELEASE THE ELECTRIC STRIKE ALLOWING THE DOOR TO BE OPENED. IMMEDIATE EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
CREDENTIAL READER DEVICE.
REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE.

Hardware Group No. 08

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ML2057 CSA CT6D	626	C-R
1	EA	LFIC PERMANENT CORE	KEYED INTO EXISTING SYSTEM	626	C-R
1	EA	ELECTRIC STRIKE	6211AL FSE CON 12/16/24/28 VAC/VDC	630	VON
1	EA	OH STOP	100S	630	GLY
1	EA	SURFACE CLOSER	4040XP REG ST-1630	689	LCN
1	EA	TOP JAMB MTG PLATE	4040XP-18TJ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	CREDENTIAL READER	BY DIVISION 28		B/O
3	EA	DOOR SILENCERS			

CREDENTIAL READER DEVICE IS TO RELEASE THE ELECTRIC STRIKE ALLOWING THE DOOR TO BE OPENED. IMMEDIATE EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
CREDENTIAL READER DEVICE.
REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE.

Hardware Group No. 9

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1	EA	PANIC HARDWARE	LD-98-L-NL-07	626	VON
1	EA	LFIC RIM CYLINDER	CT6D	626	C-R
1	EA	LFIC PERMANENT CORE	KEYED INTO EXISTING SYSTEM	626	C-R
1	EA	ELECTRIC STRIKE	6111 FSE CON BSS 12/24 VAC/VDC	630	VON
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	CREDENTIAL READER	BY DIVISION 28		B/O
3	EA	DOOR SILENCERS			

CREDENTIAL READER DEVICE IS TO RELEASE THE ELECTRIC STRIKE ALLOWING THE DOOR TO BE OPENED. IMMEDIATE EGRESS IS ALWAYS AVAILABLE. KEYED INGRESS IS ALSO AVAILABLE.

ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
CREDENTIAL READER DEVICE.
REQUIRED POWER AND WIRING TO THE ELECTRIC STRIKE.

Hardware Group No. 10

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	BOTTOM DOOR PATCH AND PIVOT	AS REQ.	630	CRL
1	EA	TOP DOOR PATCH	AS REQ.	630	CRL
1	EA	REQ TO EXIT PUSH BUTTON	413MN	630	SDC
1	EA	MAG LOCK	SDC EMLOCK 1500 BRACKETS AS REQ.	AA	SDC
1	EA	LONG DOOR PULL	PR 9266F 54" P	630	IVE
1	EA	ADA CONCEALED IN HEAD CLOSER	9970 W/ 105 DEGREE HOLD OPEN		CRL
1	EA	CREDENTIAL READER	BY DIVISION 28		B/O
1	EA	MOTION SENSOR	MD-31D	WHT	SDC

NOTE: CONFIRM GLASS THICKNESS WITH GLASS DOOR SUPPLIER.
NOTE: HEADER CHANNEL AND ALL OTHER COMPONENTS REQUIRED TO MAKE THE SPECIFIED HARDWARE WORK PROPERLY IS BY THE GLASS DOOR SUPPLIER.

CREDENTIAL READER DEVICE IS TO RELEASE THE MAGNETIC LOCK ALLOWING THE DOOR TO BE OPENED. IMMEDIATE EGRESS IS ALWAYS AVAILABLE USING THE MOTION SENSOR OR THE NON-FIRE RELATED EMERGENCY RELEASE BUTTON.

THE MAGNETIC LOCKS ARE TO BE TIED TO THE FIRE ALARM SYSTEM.

THE NON-FIRE RELATED EMERGENCY RELEASE BUTTON IS TO BE WIRED DIRECTLY BETWEEN THE POWER SUPPLY FOR THE MAGNETIC LOCKS AND THE MAGNETIC LOCKS THEMSELVES.

ITEMS TO BE PROVIDED BY THE DIVISION 28 SUPPLIER:
CREDENTIAL READER DEVICE.
REQUIRED POWER AND WIRING TO THE MAGNETIC LOCK.
WIRING FOR THE PUSH BUTTON AND MOTION SENSOR.

END OF SECTION 08 71 00

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass products.
2. Glazing sealants.
3. Glazing tapes.
4. Field Applied Vinyl Film (V-x)
5. Miscellaneous glazing materials.

B. Related Requirements:

1. Section 06 42 16 "Flush Wood Doors"
2. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts."
3. Section 08 41 26 "All-Glass Entrances and Storefronts."

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors and who employs glazing technicians certified under the Architectural Glass and Metal Technician (AGMT) certification program.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.8 WARRANTY

A. Manufacturer's Special Warranty for Heat-Soaked Tempered Glass: Manufacturer agrees to replace heat-soaked tempered glass units that spontaneously break due to nickel sulfide (NiS) inclusions at a rate exceeding 0.3 percent within specified warranty period. Coverage for any other cause is excluded.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain glass from single source from single manufacturer.

B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:

1. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.

D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.

B. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. Heat soak panes of insulating glass units.

2.5 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

B. Neutral-Curing Silicone Glazing Sealant, Class 50: Complying with ASTM C920, Type S, Grade NS, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. GE Construction Sealants; Momentive Performance Materials Inc.
b. May National Associates, Inc.; a subsidiary of Sika Corporation.
c. Pecora Corporation.
d. Sika Corporation.
e. The Dow Chemical Company.
f. Tremco Incorporated.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks:

1. Type recommended in writing by sealant or glass manufacturer.

D. Spacers:

1. Type recommended in writing by sealant or glass manufacturer.

E. Edge Blocks:

1. Type recommended in writing by sealant or glass manufacturer.

F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FIELD-APPLIED, VINYL FILM (V-x)

A. Field-Applied, Vinyl Film, weather-resistant vinyl film with release liner on the back and carrier film on the front for on-site alignment and application.

1. (V-1) - Custom Applied Vinyl Film; Match Architects Custom pattern and design.

2. (V-2) - Solar Graphics; Colored Film in Color Cool Blue 5620.

3. (V-3) - Decorative Films; Solyx Glass Finishes; SXWF-WM White Matte 48 inches High.

4. (V-4) - Decorative Films; Solyx Glass Finishes; SXJ-0591 Dual Feather Gradient 72 inches High.

B. Vinyl Film: UV-resistant vinyl film with pressure-sensitive, permanent adhesive; die cut to form characters or images as indicated on Drawings.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch- minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

A. Clear Glass Type GL-01 : Fully tempered float glass.

1. Minimum Thickness: 6 mm.
2. Safety glazing required.

B. Clear Glass Type GL-02 : Fully tempered float glass.

1. Minimum Thickness: 12 mm.
2. Safety glazing required.

END OF SECTION 08 80 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing systems.
2. Grid suspension systems.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Framing systems.
2. Grid suspension systems.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Notify manufacturer of damaged materials received prior to installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, in accordance with ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

C. Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads with a maximum deflection of 3/4 inches.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C645 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C645 requirements for metal unless otherwise indicated
2. Protective Coating: Comply with ASTM C645 ; ASTM A653/A653M, G40; or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.

    a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.

B. Studs and Track: ASTM C645 .

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. ClarkDietrich.
    b. Marino\\WARE.
    c. MRI Steel Framing, LLC.

2. Minimum Base-Steel Thickness: 0.0329 inch.
3. Depth: As indicated on Drawings .

C. Slip-Type Head Joints: Where indicated, provide one of the following as required to not eliminate channel bridging at the top of the wall:

1. Double-Track System: Top outer tracks, inside track with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Steel Thickness: 0.0329 inch .

E. Hat-Shaped, Rigid Furring Channels:

1. Minimum Base-Steel Thickness: 0.0329 inch .
2. Depth: As indicated on Drawings .

F. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical .

G. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings .

2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch- diameter wire.

H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 3/4 inch, minimum uncoated-steel thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

2.3 GRID SUSPENSION SYSTEMS

A. Grid Suspension Systems for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Armstrong Ceiling & Wall Solutions.
b. Certainteed; SAINT-GOBAIN.
c. Rockfon; ROCKWOOL International.
d. USG Corporation.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:

1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLATION OF FRAMING SYSTEMS

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches o.c. unless otherwise indicated.
3. Tile Backing Panels: As required by horizontal deflection performance requirements unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLATION OF GRID SUSPENSION SYSTEMS

A. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.6 FIELD QUALITY CONTROL

A. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

B. Related Requirements:

1. Section 09 21 16.23 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.
2. Section 09 22 16 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Gypsum board, Type X.
2. Gypsum ceiling board.
3. Mold-resistant gypsum board.
4. Cementitious backer units.
5. Interior trim.
6. Joint treatment materials.
7. Laminating adhesive.
8. Sound-attenuation blankets.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

2.3 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Certainteed; SAINT-GOBAIN.
    b. Georgia-Pacific Gypsum LLC.
    c. Gold Bond Building Products, LLC provided by National Gypsum Company.
    d. USG Corporation.

2. Thickness: 5/8 inch.
3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

B. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Certainteed; SAINT-GOBAIN.
    b. Georgia-Pacific Gypsum LLC.
    c. Gold Bond Building Products, LLC provided by National Gypsum Company.

d. USG Corporation.

2. Thickness: 1/2 inch.
3. Long Edges: Tapered.

C. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Certainteed; SAINT-GOBAIN.
b. Georgia-Pacific Gypsum LLC.
c. Gold Bond Building Products, LLC provided by National Gypsum Company.
d. USG Corporation.

2. Core: 5/8 inch, Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.5 TILE BACKING PANELS

a. Georgia-Pacific Gypsum LLC.

A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Certainteed; SAINT-GOBAIN.
b. James Hardie Building Products, Inc.
c. PermaBASE Building Products, LLC provided by National Gypsum Company.
d. USG Corporation.

2. Thickness: 5/8 inch.
3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet Galvanized or aluminum-coated steel sheet or rolled zinc Plastic Paper-faced galvanized-steel sheet.
2. Shapes:

a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.

c. U-Bead: J-shaped; exposed short flange does not receive joint compound.
d. Expansion (control) joint.
e. Wall Reveal: 1/2-inch high by 5/8-inch depth.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound .

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: Vertical surfaces unless otherwise indicated.
2. Ceiling Type: Ceiling surfaces.
3. Mold-Resistant Type: Vertical surfaces behind plumbing fixtures, for a minimum distance of three feet on each side from the edge of the fixture.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLATION OF TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints in accordance with ASTM C840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.
3. Wall Reveal: Where indicated on drawings.

3.6 FINISHING OF GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and in accordance with ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.

3. Level 4: At panel surfaces that will be exposed to view with gloss level 4 or lower paint finish.

    a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

4. Level 5: At panel surfaces that will be exposed to view with gloss level 5 or higher paint finish, and at panel surfaces to receive wall covering. Also apply where indicated on Drawings.

    a. Provide USG Tuff-Hide or comparable product by other acceptable manufacturers.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 13 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain tile. (T-x)
2. Ceramic tile. (WT-x)

B. Related Requirements:

1. Section 09 29 00 "Gypsum Board" for tile backing panels.

1.2 DEFINITIONS

A. General: Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Face Size: Actual tile size, excluding spacer lugs.

C. Large Format Tile: Tile with at least one edge 15 inches or longer.

D. Module Size: Actual tile size plus joint width indicated.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Metal edge trips in 6-inch lengths.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer employs only installers recognized by the U.S. Department of Labor as Journeyman Tile Layers for Project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store liquid materials in unopened containers and protected from freezing.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Accessory Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Metal edge strips.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.3 TILE PRODUCTS (T-x, WT-x)

A. See Legends on 'Finish Plan' drawings for product information.

B. Product Contacts:

1. Viginia Tile: Heather Posey, 630-306-8130, heather.posey@virginiatile.com

2.4 SETTING MATERIALS

A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ARDEX Americas.
b. Laticrete International, Inc.
c. MAPEI Corporation.

2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.15.

2.5 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ARDEX Americas.

b. Bostik; Arkema.
c. Laticrete International, Inc.
d. MAPEI Corporation.

B. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ARDEX Americas.
b. Bostik; Arkema.
c. Laticrete International, Inc.
d. MAPEI Corporation.
e. Sika Corporation.

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.6 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.

B. Metal Edge Strips:

1. At all inside corners, horizontal and vertical: Schluter, Inc.; Dilex-AHK, in finishes to be selected by Architect.
2. At all outside corners, horizontal and vertical: Schluter, Inc.; Jolly, in finishes to be selected by Architect.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

D. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.

B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Substrate Flatness:

1. For tile shorter than 15 inches, confirm that structure or substrate is limited to variation of 1/4 inch in 10 ft. from the required plane, and no more than 1/16 inch in 12 inches when measured from tile surface high points.
2. For large format tile, tile with at least one edge 15 inches or longer, confirm that structure or substrate is limited to 1/8 inch in 10 ft. from the required plane, and no more than 1/16 inch in 24 inches when measured from tile surface high points.

E. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM

A. Treat joints of tile backing panels in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

B. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

1. Add materials, water, and additives in accurate proportions.

2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

C. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

    a. Exterior tile floors and walls.
    b. Tile floors in wet areas.
    c. Tile swimming pool decks.
    d. Tile floors in laundries.
    e. Tile floors consisting of tiles 8 by 8 inches or larger.
    f. Tile floors consisting of rib-backed tiles.

2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
3. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
4. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
5. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
6. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

    a. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets, so joints between sheets are not apparent in finished Work.
    b. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
    c. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

7. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

D. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

E. Metal Flooring Transitions: Install at locations indicated.

F. Metal Wall Trim: Install at locations indicated on Drawings.

G. Grout Sealer: Apply grout sealer to cementitious grout joints in accordance with manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile in accordance with tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. TCNA F111 : Method ANSI A108.1C. Cement mortar bed (thickset) installed over cleavage membrane.

a. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
b. Grout: High-performance sanded cement grout.
c. Joint Width: 1/8 inch.

B. Interior Wall Installations, Wood or Metal Studs or Furring:

1. TCNA W245 : Thinset mortar on glass-mat, water-resistant gypsum backer board.

a. Thinset Mortar: Improved modified dry-setmortar.
b. Grout: Water-cleanable epoxy grout.
c. Joint Width: 1/8 inch.

END OF SECTION 09 30 13

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical panels (Ceiling Type x .)
2. Metal suspension system.
3. Metal edge moldings and trim.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Acoustical panels.
2. Metal suspension system.
3. Metal edge moldings and trim.

B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Panels: Set of 6-inch- square Samples of each type, color, pattern, and texture.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A in accordance with ASTM E1264.
2. Smoke-Developed Index: 50 or less.

2.3 ACOUSTICAL PANELS

A. Manufacturer Contacts:

1. Armstrong: Trish Albertini, 312-405-9871, talbertini@armstrongceilings.com.
2. GS Acoustics: Tom Tometz, 773-575-1138, tom@tometz.com
3. Rulon International: Derek Carpenter, 773-991-6606, dcarpenter@rulonco.com

B. Celing Type 2A and 2B: For use with 15/16 inch grid.

1. Products:

a. Armstrong, Inc.; Cortega, with angled tegular edge.

2. Modular Size: 24 inches by 24 inches by 5/8 inches.
3. Color: Ceiling Type 2A - White.
4. Color: Ceiling Type 2B - Black.
5. NRC: 0.70.

C. Celing Type 3: For use with 15/16 inch grid.

1. Products:

a. Armstrong, Inc.; Cirrus Second Look III, with Beveled tegular edge.

2. Modular Size: 24 inches by 48 inches by 3/4 inches.
3. Color: White.
4. NRC: 0.70.

D. Ceiling Type 4: PET Ceiling Tile for use with 15/16 inch grid.

1. Products:

a. GS Acoustics; aCapella aTiles Ceiling Panel for 15/16 inch Lay-in grid.

2. Modular Size: 24 inches by 48 inches by 1/2 inch.
3. Color: Frost
4. NRC: 0.85.

2.4 METAL SUSPENSION SYSTEM

A. For acoustical panel tiles indicated for use with 15/16 inch grid.

1. Manufacturers:

a. Armstrong, Inc.; Prelude 15/16.

2. Structural Classification: Intermediate Duty.
3. Color: Ceiling Type 2A and 3 - White.
4. Color: Ceiling Type 2B and 4 - Black

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing in accordance with ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Type: Postinstalled expansion anchors.
b. Corrosion Protection, Carbon Steel: Components zinc plated in accordance with ASTM B633, Class SC 1 (mild) service condition.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch- diameter wire.

C. Provide perimeter "Teg Tabs" perimeter trim at tegular edge ceiling systems.

1. Size as required to match ceiling system.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Edge moldings to fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
4. Perimeter metal trim:

a. Provide 2-inch and 6-inch perimeter transition trim in white color where indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

A. Install acoustical panel ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
5. Protect lighting fixtures and air ducts in accordance with requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Thermoset-rubber base (RB-x).
2. Rubber molding accessories (TRANS-x).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE (RB-x)

A. See Legends on 'Finish Plan' drawings for product information.

B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).

C. Thickness: 0.125 inch.

D. Height: 4 inches.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Preformed.

G. Inside Corners: Job formed or preformed.

H. Colors: As indicated by manufacturer's designations.

2.2 RUBBER MOLDING ACCESSORY (TRANS-x)

A. See Legends on 'Finish Plan' drawings for product information.

B. Colors and Patterns: As indicated by manufacturer's designations.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less and 60 g/L or less for rubber stair treads.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

a. Miter corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.

1. Apply number of coat(s) recommended by manufacturer.

E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid vinyl floor tile (LVT-x).
2. Quartz Tile (QT-x)

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of resilient floor tile.

1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
2. Show details of special patterns.

C. Samples: Full-size units of each color, texture, and pattern of floor tile required.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SOLID VINYL FLOOR TILE (LVT-x)

A. See Legends on 'Finish Plan' drawings for product information.

B. Colors and Patterns: As indicated by manufacturer's designations.

2.3 QUARTZ FLOOR TILE (QT-x)

A. See Legends on 'Finish Plan' drawings for product information.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated.

C. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

D. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

F. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

G. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply number of coat(s) recommended by manufacturer.

E. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Carpet tile (CPT-x).
2. Walk off Carpet (WLKF).

B. Related Requirements:

1. Section 09 65 13 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Shop Drawings: For carpet tile installation, showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples for Verification: Actual sample of finished products for each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 10 full-size units.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.7 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended in writing by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.8 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:

    a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
    b. Loss of tuft-bind strength.
    c. Excess static discharge.
    d. Delamination.
    e. Dimensional instability.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE (CPT-x)

A. See Legends on 'Finish Plan' drawings for product information.

2.2 WALK OFF CARPET (WLKF)

A. See Legends on 'Finish Plan' drawings for product information.

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended in writing by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive types to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and that are recommended in writing by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet tile for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

D. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer. Verify the following:

1. Underlayment surface is flat, smooth, evenly planed, tightly jointed, and free of irregularities, gaps greater than 1/8 inch, protrusions more than 1/32 inch, and substances that may interfere with adhesive bond or show through surface.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, in accordance with manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

D. Maintain pile-direction patterns indicated on Drawings.

E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended in writing by carpet tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive and other surface blemishes using cleaner recommended in writing by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 13.7.

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13

SECTION 09 72 00 - WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Vinyl wall covering (WC-x).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.

B. Shop Drawings: Show location and extent of each wall-covering type. Indicate seams and termination points.

C. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36 inches long in size.

1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied.

a. Show complete pattern repeat.
b. Mark top and face of fabric.

D. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.

B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates in accordance with test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 50 or less.

2. Fire-Growth Contribution: No flashover and heat and smoke release when tested in accordance with NFPA 265.

2.2 VINYL WALL COVERING (WC-x)

A. Type WC-1:

B. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Maharam; Knoll Textiles; Contact: Allie Haper, 631-851-3204, aharper@maharam.com

C. Description: Provide vinyl products in rolls from same production run and complying with the following:

1. Product: Cascade by Trove WC2244
2. Color: 300148-003 Echo

2.3 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.

B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 91 23 "Interior Painting" and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

C. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation surfaces being true in plane and vertical and horizontal alignment, maximum moisture content, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, and mildew.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
2. Gypsum Board: Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
3. Painted Surfaces:

    a. Check for pigment bleeding. Apply primer/sealer to areas susceptible to pigment bleeding as recommended in writing by primer/sealer manufacturer.
    b. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.

D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION OF WALL COVERING

A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.

B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.

C. Install strips in same order as cut from roll.

1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.

D. Install wall covering without lifted or curling edges and without visible shrinkage.

E. Match pattern 72 inches above the finish floor.

F. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.

G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.

H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended in writing by wall-covering manufacturer.

C. Replace strips that cannot be cleaned.

D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

SECTION 09 84 33 - SOUND ABSORBING WALL AND CEILING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluratone Wall and Ceiling Panels (PWP-1)

B. Suspension Systems

1.2 RELATED SECTIONS

A. Section 09 29 00 - Gypsum Board.

1.3 REFERENCES

A. ASTM E 84 - Title; 2001.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Wood is a natural product that will undergo changes with variations in the environment. Therefore, all dimensional tolerances are plus or minus 1/8 inch (3 mm).

B. Suspension System: Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1:360.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Provide layout of wood wall panels, z-clips, and furring strips coordinated with other trades that will penetrate the wood walls or interfere with the installation and recessed or surface mounted devices located within the wall panels. Indicate method of attachments where interference exists.

D. Verification Samples: For each finish product specified, two samples, minimum size 12 inches square, representing actual product, color, and patterns.

E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

F. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic checking and adjustment and periodic cleaning and maintenance of all components.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Minimum 2 years documented experience installing projects of

similar size and complexity.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.
   4. Accepted mock-ups shall be comparison standard for remaining Work.

D. Pre-Installation Conference: Convene minimum two weeks prior to starting work of this section. Agenda shall include project conditions, coordination with work of other trades, and layout of items that penetrate walls.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver material in the manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store products off the floor in manufacturer's unopened packaging protected from exposure to harmful environmental conditions and at temperature and humidity conditions as recommended by the manufacturer.

C. A minimum of 72 hours prior to wall installation, wood wall panels shall be stored in the room in which they will be installed. The temperature and humidity of the room during this period shall closely approximate those conditions that will exist when the building is occupied.

D. Handle materials to avoid damage.

1.8 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Plenums have proper ventilation, especially in high moisture areas with no excessive buildup of heat in the ceiling areas.

C. Space shall be fully enclosed with all exterior windows and doors in place, glazed, and weather-stripped. Roof is to be watertight, and all wet trades' work is to be completed, and thoroughly dry.

D. Mechanical, electrical, and other utility services behind the wall plane shall be completed. No materials should rest against, or wrap around, the wall attachment components or connecting z-clips.

E. Install only when the temperature and humidity closely approximate the interior conditions

that will exist when the building is occupied. Heating and cooling systems shall be operating before, during, and after installation, with the humidity of the interior spaces maintained between 25 and 55 percent, and a temperature between 60 to 90 degrees F.

1.10 COORDINATION

A. Coordinate layout and installation of the wood wall panels with other work penetrating the wall including light fixtures, HVAC equipment, and fire suppression system components.

1.11 EXTRA MATERIALS

A. See Section 01 60 00 - Product Requirements.

B. Deliver materials for Owner's use in maintenance.

1. Provide 5 percent of each type actually installed for use by owner in building maintenance and repair.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Rulon International, which is located at: 2000 Ring Way Rd.; St Augustine, FL 32092; Toll Free Tel: 800-227-8566; Tel: 904-584-1400; Fax: 904-584-1499; Email: request info (info@rulonco.com); Web:rulonco.com

B. Substitutions: Approved Equal; 9Wood System

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIALS - GENERAL

A. Wood is a natural product that will undergo changes with variations in the environment. Therefore, all dimensional tolerances are plus or minus 1/8 inch (3 mm).

2.3 ALURATONE WALL AND CEILING PANELS (PWP-1)

A. Aluratone 700 Series acoustic wall and ceiling panels are made from premium grade veneers adhered to a MDF or particleboard substrate and provided with perforation patterns through the panel designed to allow for direct sound absorption. Acoustical absorptive black backing is applied in the factory. Acoustical performance is dependent on project design, application, mounting method, and additional sound absorbent material. Acoustical performance can be achieved up to NRC-0.90.

1. Panel Size: 48 inches by 120 inches by ¾ inch.
2. Perforation Openings:

a. Diameter:

1) 5/16 inch (8 mm)

b. Spacing

1) 1-1/4 inches (32 mm

c. Alignment

1) Straight Spacing

3. Trim and Border Treatment: Provide end caps or junction trims as indicated. Solid wood perimeter trim, size and dimension as noted in drawings, (WD-3, see flush wood panel specification)

4. Veneer Species:

a. White Oak, Rift Cut.

5. Finish:

a. Natural; Custom Stain, to match Architects Sample.

2.4 ACCESSORIES

A. (Ceiling System) C-Hangers: Suspension hangers that are direct-screwed to the panel and hang over the heavy duty-grid. Hangers are made of spring-steel with phosphate pre-treatment and corrosion-resistant coating.

B. Acoustic Nonwoven Backers: Thin, sound-absorbing fabrics that can be applied to a substrate in order to increase sound attenuation.

C. (Wall System) Z-Clips: Male/female aluminum attachment clips, similar to a French cleat but with a thinner profile, used to hang wood wall panels on furring strips.

2.5 ATTACHMENT SYSTEMS

A. Furring Strips: Thin strips of fire-treated plywood or other non-combustible or limited combustible material shall be used in conjunction with fire treated or other non-combustible or limited combustible shims to level or raise z-clip attachment points so that, when installed, wood wall panels are flush and plumb.

2.6 SUSPENSION SYSTEMS

A. Main Tees: Standard heavy duty 15/16 inch T-rail specified in Section 09 51 13 – Acoustical Panel Ceilings.

B. Hangers; shall be Suspend ceiling panels from T-rail using C-hangers as recommended by the manufacturer.

2.7 FABRICATION

A. Edges, borders, and perimeter trims shall be indicated on the Drawings in accordance with the manufacturer's standard design details. All wood wall panel products specified shall be supplied by the wood wall panel manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify that furring strips are in place, attached and shimmed in a direction parallel to the floor.

C. Verify that T-rail carriers specified in Section 09 22 26 - Suspension Systems are in place, suspended and leveled in a direction perpendicular to the wooden strip direction of the wood panels.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Work shall not begin until the space is fully enclosed and glazed and all wet work is completed and dried out to the satisfaction manufacturer.

C. Temperature shall be at least 65 degrees Fahrenheit during the installation and thereafter.

D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction, including the following:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Additional Hanger Wires: Wrapped tightly 3 full turns to structure and component at locations where imposed loads could cause deflection exceeding 1/360 span or tolerances specified below.

B. Install furring strips attached and shimmed in a direction parallel to the floor.

C. Suspend panels from the z-clips as indicated.

D. Use a laser leveling device to lay out and install the perimeter trim as specified.

E. Suspend panels from the T-rail carrier system as indicated.

F. Make final adjustments to level or contours as required.

3.4 FIELD QUALITY CONTROL

A. Technical Service: Manufacturer shall provide a local Technical Service Representative for on-site training and assistance during the installation process.

B. Environmental Monitoring: Manufacturer shall provide a temperature and humidity sensor to actively monitor the room in which the wood wall panels shall be installed for a minimum of one week before and up to two weeks after installation has been completed including all of the weeks in between.

C. Upon completion of wall installation, the owner's representative shall inspect all finished surfaces to ensure that the work has been completed in a manner satisfactory to the owner. Any deficiencies in the install of the wall shall be corrected prior to substantial completion.

3.5 ADJUSTMENTS AND CLEANING

A. Clean exposed surfaces of wall panels in accordance with manufacturer's instructions.

B. Remove and replace panels and tiles, which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 09 84 33

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Primers.
2. Water-based finish coatings.
3. Floor sealers and paints.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include preparation requirements and application instructions.
2. Indicate VOC content.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Sherwin-Williams Company (The).

B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. Colors: As indicated in a color schedule.

1. Thirty percent of surface area will be painted with deep tones.

2.3 PRIMERS

A. Interior/Exterior Latex Block Filler: Water-based, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.

B. Alkali-Resistant, Water-Based Primer: Water-based primer formulated for use on alkaline surfaces, such as plaster, vertical concrete, and masonry.

C. Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.

2.4 WATER-BASED FINISH COATS

A. Interior, Latex, High-Performance Architectural Coating, Eggshell: High-performance architectural latex coating providing a significantly higher level of performance than conventional latex paints in the areas of scrub resistance, burnish resistance, and ease of stain removal.

B. Interior, Latex, High-Performance Architectural Coating, Semigloss: High-performance architectural latex coating providing a significantly higher level of performance than conventional latex paints in the areas of scrub resistance, burnish resistance, and ease of stain removal.

2.5 FLOOR SEALERS AND PAINTS

A. Water-Based Concrete Floor Sealer: Clear, water-based, acrylic-copolymer-emulsion sealer formulated for oil, gasoline, alkali, and water resistance and for use on concrete traffic surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMUs): 12 percent.
3. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 3.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 INSTALLATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.

f. Tanks that do not have factory-applied final finishes.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
g. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
3. Allow empty paint cans to dry before disposal.
4. Collect waste paint by type and deliver to recycling or collection facility.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Traffic Surfaces:

1. Water-Based Concrete Floor Sealer System :

a. First Coat: Matching topcoat.
b. Topcoat: Water-based concrete floor sealer.

B. CMU Substrates:

1. High-Performance Architectural Latex System :

    a. Block Filler: Interior/exterior latex block filler.
    b. Intermediate Coat: Matching topcoat.
    c. Topcoat: Interior, latex, high-performance architectural coating, eggshell semigloss.

C. Steel Substrates:

1. High-Performance Architectural Latex System :

    a. Prime Coat: Shop primer specified in Section where substrate is specified.
    b. Intermediate Coat: Matching topcoat.
    c. Topcoat: Topcoat: Interior, latex, high-performance architectural coating, semigloss.

D. Gypsum Board Substrates:

1. High-Performance Architectural Latex System :

    a. Prime Coat: Interior latex primer sealer.
    b. Intermediate Coat: Matching topcoat.
    c. Topcoat: Interior, latex, high-performance architectural coating, satin.

END OF SECTION 09 91 23

SECTION 10 11 00 - VISUAL DISPLAY UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Visual display board assemblies (MB-x).
2. Accessories.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Visual display board assemblies.
2. Glass markerboards.
3. Accessories.

B. Shop Drawings: For visual display units.

1. Include plans, elevations, sections, details, and attachment to other work.
2. Show locations of panel joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
3. Include sections of typical trim members.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For visual display units to include in maintenance manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.6 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Surfaces lose original writing and erasing qualities.
b. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period:

a. Life of the building.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 VISUAL DISPLAY BOARD ASSEMBLIES (MB-x, where x is width of board in feet)

A. Visual Display Board Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ASI Visual Display Products.
b. Bangor Cork.
c. Claridge Products and Equipment, Inc.
d. MooreCo Inc.
e. PolyVision Corporation.

B. Visual Display Board Assembly: factory fabricated.

1. Assembly: markerboard .
2. Corners: Square .
3. Mounting Method: Direct to wall.

C. Markerboard Panel: Porcelain-enamel-faced markerboard panel on core indicated.

1. Color: White .

D. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- thick, extruded aluminum; standard size and shape.

1. Aluminum Finish: Clear anodic finish.

E. Joints: Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.

2.3 ACCESSORIES

A. Marker/Cloth Caddy: Provide one caddy per markerboard assembly unit unless shown otherwise on Drawings:

1. Product: Ideapaint, Inc.; Perch Pack.
2. Mount to gypsum board surface with mechanical fasteners.

2.4 MARKERBOARD PANELS

A. Porcelain-Enamel Markerboard Panels: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction, consisting of moisture-barrier backing, core material, and porcelain-enamel face sheet with [high] [low]-gloss finish. Laminate panels under heat and pressure with manufacturer's standard, flexible waterproof adhesive.

1. Manufacturer's Standard Core: Minimum 1/4 inch thick, with manufacturer's standard moisture-barrier backing.
2. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.

2.5 MATERIALS

A. Porcelain-Enamel Face Sheet: PEI-1002, with face sheet manufacturer's standard two- or three-coat process.

B. Hardboard: ANSI A135.4, tempered.

C. Particleboard: ANSI A208.1, Grade M-1.

D. MDF: ANSI A208.2, Grade 130.

E. Fiberboard: ASTM C208 cellulosic fiber insulating board.

F. Clear Tempered Glass: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality Q3, with exposed edges seamed before tempering.

G. Extruded Aluminum: ASTM B221, Alloy 6063.

H. Adhesives for Field Application: Mildew-resistant, nonstaining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit manufacturer.

1. Adhesives shall have a VOC content of 50 g/L or less.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA AMP 500 for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motorized, sliding visual display units.

C. Examine walls and partitions for proper preparation and backing for visual display units.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.

C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.

3.3 INSTALLATION

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

B. Factory-Fabricated Visual Display Board Assemblies:

1. Attach concealed clips, hangers, and grounds to wall surfaces and to visual display board assemblies with fasteners at not more than 16 inches o.c. Secure tops and bottoms of boards to walls.

C. Visual Display Board Assembly Mounting Heights: Install visual display units at mounting heights indicated on Drawings, or if not indicated, at heights indicated below.

1. Mounting Height for Grades 7 and Higher: 36 inches above finished floor to top of chalktray.

3.4 CLEANING AND PROTECTION

A. Clean visual display units in accordance with manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display units after installation and cleaning.

END OF SECTION 10 11 00

SECTION 10 14 19 - DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Dimensional characters.

a. Cast dimensional characters.
b. Cutout dimensional characters.

1.2 COORDINATION

A. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign.
4. Show locations of electrical service connections.
5. Include diagrams for power, signal, and control wiring.

C. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Dimensional Characters: Full-size Sample of[each type of] dimensional character.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify locations of electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design sign structure and anchorage of sign type(s) according to structural performance requirements.

B. Thermal Movements: For exterior , allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 DIMENSIONAL CHARACTERS

A. Cast Characters : Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. ACE Sign Systems, Inc.
b. ASI Sign Systems, Inc.
c. Gemini Incorporated.

2. Character Material: Cast aluminum.

3. Character Height: As indicated on Drawings.
4. Thickness: As indicated on Drawings.
5. Finishes:

    a. Integral Aluminum Finish: Brushed Aluminum.

6. Mounting: As indicated on Drawings.
7. Typeface: As indicated on Drawings.

B. Cutout Characters : Characters with uniform faces; square-cut, smooth, eased edges; precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. ACE Sign Systems, Inc.
    b. ASI Sign Systems, Inc.
    c. Gemini Incorporated.

2. Character Material: Sheet or plate acrylic.
3. Character Height: As indicated on Drawings.
4. Thickness: As indicated on Drawings.
5. Finishes:

    a. Integral Acrylic Color: Match Architect's sample.

6. Mounting: Adhesive .
7. Typeface: As Indicated on Drawings.

2.3 DIMENSIONAL CHARACTER MATERIALS

A. Aluminum Castings: ASTM B26/B26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.

B. Aluminum Sheet and Plate: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

C. Aluminum Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

D. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.

B. Adhesive: As recommended by sign manufacturer.

C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
7. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Verify that electrical service is correctly sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF DIMENSIONAL CHARACTERS

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 14 19

SECTION 10 14 23 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Field-applied, vinyl-character signs.

B. Related Requirements:

1. Section 08 80 00 "Glazing" for glass substrates required for panel signage.
2. Section 10 14 23.16 "Room-Identification Panel Signage" for room-identification signs that are directly attached to the building.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Field-applied, vinyl-character signs.

B. Shop Drawings: For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign.

C. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Field-Applied, Vinyl-Character Signs: Sample of vinyl materials.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Deterioration of finishes beyond normal weathering.
    b. Deterioration of embedded graphic image.
    c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FIELD-APPLIED, VINYL-CHARACTER SIGNS

A. Field-Applied, Vinyl-Character Sign : Prespaced characters die cut from 3- to 3.5-mil thick, weather-resistant vinyl film with release liner on the back and carrier film on the front for on-site alignment and application.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. APCO Graphics, Inc.
    b. Allen Markings.
    c. Mohawk Sign Systems.
    d. Seton Identification Products; a Brady Corporation company.
    e. inpro Corporation.

2. Size: As indicated on Drawings .
3. Substrate: As indicated on Drawings .
4. Text and Font: As indicated on Drawings .
5. For custom graphics, artwork to be provided by Architect.

B. Where vinyl product is applied to rough or uneven surfaces, such as concrete and CMU, provide substrate layer of 3M Envision Print Wrap Film LX & SV 480mC.

2.2 PANEL-SIGN MATERIALS

A. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated on Drawings and suitable for exterior applications.

2.3 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Field-Applied, Vinyl-Character Signs: Clean and dry substrate. Align sign characters in final position before removing release liner. Remove release liner in stages, and apply and firmly press characters into final position. Press from the middle outward to obtain good bond without blisters or fishmouths. Remove carrier film without disturbing applied vinyl film.

C. Signs Mounted on Glass (and visible from rear): Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign and two-face tape.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 14 23

SECTION 10 26 00 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Corner guards (CG-x).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.

B. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:

1. Corner Guards: 12 inches long.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
2. Keep plastic materials out of direct sunlight.
3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.

a. Store corner-guard covers in a vertical position.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

2.3 CORNER GUARDS (CG-x)

A. Surface-Mounted, Opaque-Plastic Corner Guards : Fabricated as one piece from PVC plastic or acrylic-modified vinyl sheet; with formed edges; fabricated with 90- or 135-degree turn to match wall condition.

1. Products: Subject to compliance with requirements, provide the following products where indicated on Drawings:
2. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Construction Specialties, Inc.; Acrovyn VA series and LG Series as indicated on drawings.

3. Wing Size: Nominal 3/4 by 3/4 inch .
4. Mounting: Adhesive.

5. Color and Texture: As indicated by manufacturer's designations .

2.4 MATERIALS

A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.

B. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC01, Class 1 or Class 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft.-lbf/in. of notch when tested according to ASTM D 256, Test Method A.

C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

D. Adhesive: As recommended by protection product manufacturer.

2.5 FABRICATION

A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances, fire rating, and other conditions affecting performance of the Work.

B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall and door protection.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 10 26 00

SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories (TA-x).
2. Childcare accessories (TA-x).

1.2 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data Submittals: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.5 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials: Owner to Provide and Install the following items:

1. TA-6: Surface-mounted Soap Dispenser.
2. TA-7: Surface-mounted Paper Towel Dispenser.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2.3 PUBLIC-USE WASHROOM ACCESSORIES (TA-x)

A. Products: Provide one of the following product lines:

1. Bobrick; Trimline series.

B. Accessories:

1. TA-1: Surface-mounted Toilet Paper Dispenser.; Bobrick, B-4288
2. TA-2: Surface-mounted Sanitary Napkin Disposal.; Bobrick, B-270
3. TA-3A, 3B, 3C: ADA compliant grab bars; 1-1/2-inch diameter stainless steel tubing in slip-resistant satin finish (No. 4) with snap flange; lengths as indicated in Drawings.; Bobrick B-6806
4. TA-5: Frameless mirrors with polished edges, mechanically fastened to walls; size as indicated on Drawings.; B-1658

2.4 CHILDCARE ACCESSORIES (TA-x)

A. Accessories:

1. TA-8: ADA compliant Diaper-Changing Station.

a. Bobrick; Koala Kare KB301-SS.

2.5 MATERIALS

A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch- minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch- minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.

F. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

END OF SECTION 10 28 00

SECTION 10 44 13 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguisher.

B. Related Requirements:

1. Section 10 44 16 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
2. Show location of knockouts for hose valves.

B. Shop Drawings: For fire-protection cabinets.

1. Include plans, elevations, sections, details, and attachments to other work.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.3 FIRE-PROTECTION CABINET (SFEC, RFEC)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Guardian Fire Equipment, Inc.
2. J. L. Industries, Inc.; Activar Construction Products Group, Inc.
3. Larsen's Manufacturing Company.
4. Potter Roemer LLC; a Division of Morris Group International.

B. Fire-Protection Cabinet Type: Suitable for fire extinguisher .

C. Cabinet Construction: Nonrated unless located in fire rated construction, then match rating of construction.

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch- thick cold-rolled steel sheet lined with minimum 5/8-inch- thick fire-barrier material. Provide factory-drilled mounting holes.

D. Cabinet Material: Cold-rolled steel sheet .

E. Recessed Cabinet:

1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

F. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.
2. Rolled-Edge Trim: 2-1/2-inch backbend depth.

G. Cabinet Trim Material: Same material and finish as door.

H. Door Material: Steel sheet.

I. Door Style: Fully glazed panel with frame .

J. Door Glazing: Acrylic sheet.

1. Acrylic Sheet Color:

a. Clear transparent acrylic sheet.

K. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard hinge, permitting door to open 180 degrees.

L. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate .

a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet door .
2) Application Process: Decals .
3) Lettering Color: Red .
4) Orientation: Vertical .

M. Materials:

1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.

a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
c. Color: As selected by Architect from manufacturer's full range .

2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

2.4 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames of one-piece construction with edges flanged.
2. Miter and weld perimeter door frames and grind smooth.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION OF FIRE-PROTECTION CABINETS

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at height indicated below:

1. Fire-Protection Cabinet Mounting Height: 42 inches above finished floor to top of fire extinguisher.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
3. Fire-Rated Cabinets:

a. Install cabinet with not more than 1/16-inch tolerance between pipe OD and knockout OD. Center pipe within knockout.
b. Seal through penetrations with firestopping sealant as specified in Section 07 84 13 "Penetration Firestopping."

C. Identification:

1. Apply decals at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 44 13

SECTION 10 44 16 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Requirements:

1. Section 10 44 13 "Fire Protection Cabinets."

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS (FE)

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Activar Construction Products Group, Inc. - JL Industries.
b. Guardian Fire Equipment, Inc.
c. Larsens Manufacturing Company.
d. Potter Roemer LLC; a Division of Morris Group International.

2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
3. Valves: Manufacturer's standard .
4. Handles and Levers: Manufacturer's standard .
5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container : UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Activar Construction Products Group, Inc. - JL Industries.
b. Guardian Fire Equipment, Inc.
c. Larsens Manufacturing Company.
d. Potter Roemer LLC; a Division of Morris Group International.

2. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical .

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

1. Mounting Height: Top of fire extinguisher to be at 42 inches above finished floor.

END OF SECTION 10 44 16

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated, single-roller shades (RS-x).

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples for Initial Selection: For each type and color of shadeband material.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED, SINGLE-ROLLER SHADES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Draper Inc.; Shearweave, or comparable product by one of the following:

1. Hunter Douglas Contract.
2. Lutron Electronics Co., Inc.
3. MechoShade Systems, Inc.

B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: Stainless steel.

a. Loop Length: Full length of roller shade.

1) At clerestory windows, extend loop length to 42 inches above finished floor.

b. Limit Stops: Provide upper and lower ball stops.
c. Chain-Retainer Type: Chain tensioner, jamb mounted.

2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.

a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.

C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: Right side of interior face of shade.
2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
3. Shadeband-to-Roller Attachment: Manufacturer's standard method.

D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

F. Shadebands:

1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

a. Type: Enclosed in sealed pocket of shadeband material.

G. Installation Accessories:

1. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.

a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 5 inches.
b. Provide pocket with lip at lower edge to support acoustical ceiling panel.

2. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.

1. Source: Roller shade manufacturer.
2. Basis-of-Design: Draper, Inc.; Shearweave.
3. Orientation on Shadeband: Up the bolt.
4. Openness Factor: 1 percent.
5. Color: White/Platinum.

2.4 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
2. Skylight Shades: Provide battens and seams at uniform spacings along shadeband as required to ensure shadeband tracking and alignment through its full range of movement without distortion or sag of material.
3. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

C. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

3.6 ROLLER SHADE TYPES

A. Type RS-1: Manually operated, single-roller shade, with recessed shade pocket.

END OF SECTION 12 24 13

SECTION 12 36 23.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad countertops.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings:

1. Plans, sections, details, edge and backsplash profiles, and attachments to other work.
2. Locations and details of joints.
3. Locations and sizes of cutouts and holes for items installed in countertop.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of products.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.

B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.5 FIELD CONDITIONS

A. Environmental Limitations with Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 SOURCE CONTROL

A. Provide plastic-laminate-clad architectural cabinets, plastic-laminate-clad lockers, and plastic-laminate-clad countertops from single fabricator.

2.2 PLASTIC-LAMINATE-CLAD COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with ANSI/AWI 1236 for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain requirements that are more stringent than that of the referenced quality standard. Comply with requirements of the Contract Documents in addition to those of referenced quality standard.

B. Grade: Premium .

C. High-Pressure Decorative Laminate: ISO 4586-3, Grade .

1. See "Millwork Finish Types" Legend on drawings for product information.

D. Edge Treatment: Provide the following where indicated on Drawings.

1. Post-formed edge; same as laminate cladding on horizontal surfaces.
2. 1 inch vinyl T-molding with flat face, color matched to laminate.
3. 3-mm PVC edging.

E. Core Material: Particleboard or MDF .

F. Core Material at Sinks: Particleboard made with exterior glue MDF made with exterior glue .

G. Core Thickness: 3/4 inch .

1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

B. Composite Panel Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard (MDF): ANSI A208.2, MR 50.

a. Grade 130 .

2. Particleboard: ANSI A208.1, MR 50.

a. Grade M-2 .

2.4 MISCELLANEOUS MATERIALS

A. Adhesive for Bonding Plastic Laminate: Type I, waterproof type as selected by fabricator to comply with requirements.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

B. Installation Adhesive: Manufacturer's standard product that is recommended for application indicated.

2.5 FABRICATION

A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.

B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of dates and times countertop fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended, and check measurements of assemblies against field measurements before disassembling for shipment.

C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of cutouts by saturating with varnish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.3 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
2. Seal edges of cutouts by saturating with varnish.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where indicated on Shop Drawings.

1. Secure field joints in countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Countertop Installation:

1. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
3. Anchor wall cleating necessary for proper setting for countertops not supported by casework.
4. Install countertops level and true in line. Use concealed shims as required to maintain not more than 1/8-inch-in-96-inch variation from a straight, level plane.
5. Secure backsplashes to walls with adhesive.
6. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.4 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where impossible to repair, replace countertops. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semiexposed surfaces.

C. Protection: Provide kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION 12 36 23.13

SECTION 12 36 61.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

C. Samples for Verification: For the following products:

1. Countertop material, 6 inches square.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.6 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS (SS-x)

A. See Legends on "Finish Plan" drawings for product information.

2.2 FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Premium.

B. Configuration:

1. Front: Straight, slightly eased at top.
2. Backsplash: Straight, slightly eased at corner.
3. End Splash: Matching backsplash.

C. Countertops:

1. 1/2-inch- thick, solid surface material with front edge built up with same material.

D. Backsplashes: 1/2-inch- thick, solid surface material.

E. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.
2. Install integral sink bowls in countertops in the shop.

F. Joints:

1. Fabricate countertops without joints.
2. Fabricate countertops in sections for joining in field.

a. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.
b. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.

G. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

    a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.

2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

1. Install metal splines in kerfs in countertop edges at joints where indicated on shop drawings. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

I. Apply sealant to gaps at walls; comply with Section 07 92 00 "Joint Sealants."

END OF SECTION 12 36 61.16

SECTION 23 05 03 - HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Pipe and pipe fittings for the following systems:

1. Heating water piping.
2. Equipment drains and over flows.
3. Natural gas piping.
4. Unions and flanges.

1.3 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME B16.3 - Malleable Iron Threaded Fittings.
2. ASME B16.4 - Gray Iron Threaded Fittings.
3. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
4. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
5. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
6. ASME B31.9 - Building Services Piping.
7. ASME B36.10M - Welded and Seamless Wrought Steel Pipe.
8. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

B. ASTM International:

1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM A234 - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
3. ASTM A395 - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
4. ASTM A536 - Standard Specification for Ductile Iron Castings.
5. ASTM B32 - Standard Specification for Solder Metal.
6. ASTM B68 - Standard Specification for Seamless Copper Tube, Bright Annealed.
7. ASTM B75 - Standard Specification for Seamless Copper Tube.
8. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
9. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
10. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
11. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

12. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
13. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
14. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
15. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
16. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
17. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
18. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.
19. ASTM F 2389-07 - Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems.

C. American Welding Society:

1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
2. AWS D1.1 - Structural Welding Code - Steel.

D. American Water Works Association:

1. AWWA C105 - American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
2. AWWA C110 - American National Standard for Ductile-Iron and Grey-Iron Fittings, 3 in. through 48 in. (75 mm through 1200 mm), for Water and Other Liquids.
3. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.

E. National Fire Protection Association:

1. NFPA 30 - Flammable and Combustible Liquids Code.
2. NFPA 54 - National Fuel Gas Code.

F. Other References:

1. CSA B137.11 - Polypropylene (PP-R) Pipe and Fittings for Pressure Applications.
2. NSF/ANSI 14 - Plastic Piping System Components and Related Materials

1.4 SUBMITTALS

A. See Division 01 for project requirements.: Submittal procedures for project requirements.

B. Coordination Shop Drawings: Provide 1/4" = 1'-0" scale drawings indicating location and elevation of equipment, hot water piping, valving, refrigerant piping, etc., prior to fabrication or installation of any work. Drawings shall also be submitted electronically in AutoCAD to ventilation contractor who will create "overlay" drawings indicating locations and elevations of work of all trades in different colors for final coordination and sign-off by all trades.

C. Product Data: Submit data on pipe materials and fittings. Submit manufacturers catalog information.

D. Welders' Certificate: Include welders' certification of compliance with ASME Section IX or AWS D1.1.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASME B31.1 and ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.

B. Polypropylene Piping:

1. Material shall be certified by NSF International as complying with NSF 14, and ASTM F 2389 or CSA B137.11.
2. Material shall comply with manufacturers specifications.
3. Special Engineered products shall be certified by NSF International as complying with NSF 14.

1.6 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum five years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Furnish temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.9 ENVIRONMENTAL REQUIREMENTS

A. See Division 01 for project requirements.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.11 COORDINATION

A. See Division 01 for project requirements.

1.12 WARRANTY

A. Polypropylene Piping:

1. Manufacturer shall warrant pipe and fittings for 10 years to be free of defects in materials or workmanship.
2. Warranty shall cover labor and material costs of repairing and/or replacing defective materials and repairing any incidental damage caused by failure of the piping system due to defects in materials or workmanship.

PART 2 - PRODUCTS

2.1 HEATING WATER PIPING, ABOVE GROUND

A. Steel Pipe: ASTM A53, Schedule 40, black.

1. Fittings:

a. ASME B16.3, malleable iron or ASTM A234/A234M, forged steel welding type.
b. ASTM A234/A234M carbon steel, grooved ends.
c. Plain-end mechanical fittings.

2. Joints:

a. Threaded for pipe 2 inch and smaller; welded for pipe 2-1/2 inches and larger.
b. Grooved mechanical couplings meeting ASTM F1476.

B. Copper Tubing: ASTM B88, Type L, hard drawn.

1. Fittings: ASME B16.18, cast brass, or ASME B16.22, solder wrought copper.
2. Joints:

    a. Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.
    b. Press Fittings: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM.

2.2 EQUIPMENT DRAINS AND OVERFLOWS

A. Steel Pipe: ASTM A53, Schedule 40, black.

1. Fittings:

    a. ASME B16.3, malleable iron or ASTM A234/A234M, forged steel welding type.
    b. ASTM A234/A234M carbon steel, grooved ends.
    c. Plain-end mechanical fittings.

2. Joints:

    a. Threaded for pipe 2 inch and smaller; welded for pipe 2-1/2 inches and larger.
    b. Grooved mechanical couplings meeting ASTM F1476.

B. Copper Tubing: ASTM B88, Type L, hard drawn.

1. Fittings: ASME B16.18, cast brass, or ASME B16.22, solder wrought copper.
2. Joints:

    a. Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.
    b. Press Fittings: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM.

C. PVC Pipe: ASTM D1785, Schedule 40, and Schedule 80 for sizes 8 inch and larger, or ASTM D2241, SDR 21 or 26, polyvinyl chloride (PVC) material.

1. Fittings: ASTM D2466, Schedule 40, PVC, ASTM D2467, Schedule 80, PVC, or ASTM D2464 PVC, threaded.
2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.3 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53 Schedule 40 black.

1. Fittings: ASME B16.3, malleable iron, or ASTM A234 forged steel welding type.
2. Joints: Threaded for pipe 2 inch and smaller; welded for pipe 2-1/2 inches and larger.

2.4 COMPRESSED AIR PIPING

A. Copper Tubing: ASTM B88, Type L.

1. Copper Press Fittings: Conforming to ASME B16.18 cast copper alloy or ASME B16.22, wrought copper and bronze with Nitrile O-ring seals.
2. Joints: Compression type made with manufacturer's tool.

B. BALL VALVES

1. 2 inches and Smaller: MSS SP 110, Class 150, bronze, two piece body, type 316 stainless steel ball, full port, teflon seats, blow-out proof stem, threaded ends, lever handle.

2.5 UNIONS, FLANGES, AND COUPLINGS

A. Unions for Pipe 2 inches and Smaller:

1. Ferrous Piping: Class 150, malleable iron, threaded or plain-end mechanical fittings.
2. Copper Piping: Class 150, bronze unions with soldered.
3. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
4. PVC Piping: PVC.
5. CPVC Piping: CPVC.

B. Flanges for Pipe 2-1/2 inches and Larger:

1. Ferrous Piping: Class 150, forged steel, slip-on flanges.
2. Copper Piping: Class 150, slip-on bronze flanges.
3. PVC Piping: PVC flanges.
4. CPVC Piping: CPVC flanges.
5. Gaskets: 1/16 inch thick preformed neoprene gaskets.

C. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

D. Grooved mechanical couplings meeting ASTM F1476:

1. Manufacturers:

a. Victaulic.
b. Anvil Gruvlok.

2. Housing Clamps: ASTM A395 and ASTM A536 ductile iron, enamel coated or hot dipped galvanized, compatible with steel piping sizes, rigid type.
3. Gasket: Elastomer composition for operating temperature range from -30 degrees F to 230 degrees F.
4. Accessories: Steel bolts, nuts, and washers.

E. Plain-End Mechanical Fittings for Carbon Steel Pipe

1. Manufacturers:

a. Victaulic - Quick-Vic Small Diameter
b. Approved equal.

2. Housing: Plain-end mechanical fittings for Schedule 10 through Schedule 80 plain end carbon steel piping in HVAC and mechanical applications sizes NPS ½" thru 2" (DN15 thru DN50). System rated for a working pressure of 300 psi (2065 kPa). Fittings shall consist of a ductile iron housing conforming to ASTM A536, Grade 65-45-12, orange enamel coated or zinc coated and are able to be installed without disassembly.
3. Gasket: Fittings complete with gasket liner, elastomer composition for operating temperature range from -30 degrees F to 250 degrees F
4. Accessories: zinc-electroplated steel bolts and nuts as per the mechanical properties of ASTM A449, and 300 series stainless steel retainer.

F. Copper Press Connections:

1. Acceptable Manufacturers

a. Viega, 17545 Daleview Drive, Lakewood, OH 44107, 877.620.0016
b. Rigid Tool Co., 400 Clark Street, Elyria, OH 44035, 800.519.3456.
c. NIBCO, Inc., 1516 Middlebury Street, Elkhart, IN 46516-4740, 574.295.3000
d. Mertit Brass, 1 Merit Dr, Cleveland, OH 44143.

2. Press Fittings: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM.

G. Pex-A Piping:

1. Acceptable Manufacturers:

a. Watts.
b. Rahau.
c. Zurn.

2. PEX piping interior diameter must match diameter indicated on drawings. Use of nominal PEX piping diameters are not acceptable.
3. Performance Requirements: PEX-a piping and fittings shall meet the following pressure and temperature ratings:

a. 200 degrees F at 80 psi.
b. 180 degrees F at 100 psi.
c. 73.4 degrees F at 160 psi.

4. Fittings:

a. PEX-a (Engle-method Crosslinked Polyethylene) Piping:ASTM 876 with oxygen-diffusion barrier that meets DIN 4726.
b. PEX-a Fittings, Elbows and Tees (1/2 inch through 2 inch nominal pipe size): ASTM F1960 cold-expansion fitting manufactured from the following material types:

1) UNS No. C69300 Lead-free (LF) Brass.
2) 20 percent glass-filled polysulfone as specified in ASTM D6394.
3) Unreinforced polysulfone (group 01, class 1, grade 2) as specified in ASTM D6394.

4) Polyphenylsulfone (group 03, class 1, grade 2) as specified in ASTM D6394
5) Blend of polyphenylsulfone (55-80%) and unreinforced polysulfone (rem.) as specified in ASTM D6394.
6) Reinforcing cold-expansion rings shall be manufactured from the same source as PEX-a piping manufacturer and marked "F1960".

c. PEX-a Fittings (2-1/2 inch through 4 inch nominal pipe size): SDR9 compression type fitting consisting of a double O-ring insert with a compression sleeve tightened around the pipe and insert.

5. Plastic-to-Metal Transition Fittings:

a. Manufacturer: Provide fittings from the same manufacturer of the piping.
b. Threaded Brass to PEX-a Transition: One-piece brass fitting with male or female threaded adapter and F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring. Typically used for PEX sizes 2 inch and below.
c. Brass Sweat to PEX-a Transition: One-piece brass fitting with sweat adapter and F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring. Typically used for PEX sizes 2 inch and below.
d. Dezincification-resistant (DZR) Brass to PEX-a Transition: Male NPT thread and PEX compression fitting. Editor: Typically used for PEX sizes 2-1/2 inch through 4 inch.

6. Plastic-to-Metal Transition Unions:

a. Manufacturer: Provide unions from the same manufacturer of the piping.
b. Threaded Brass to PEX-a Union: One-piece brass fitting with male or female threaded adapter and F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring. Typically used for PEX sizes 2 inch and below.
c. Brass Sweat to PEX-a Union: One-piece brass fitting with sweat adapter and F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring. Typically used for PEX sizes 2 inch and below.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - ABOVE GROUND PIPING

A. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

B. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.

C. Group piping whenever practical at common elevations.

D. Press Connections: Copper press fittings shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fittings and the tubing marked a the shoulder of the fitting. The fitting alignment shall be check against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.

E. Sleeve pipe passing through partitions, walls and floors. Refer to Section 23 05 29.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 23 07 00.

H. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

I. Provide access where valves and fittings are not accessible. Coordinate size and location of access doors with Section 08 31 13.

J. Install brass ball valves or non-conducting dielectric nipples wherever jointing dissimilar metals.

K. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.

L. Slope piping and arrange systems to drain at low points.

M. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

N. Install piping penetrating roofed areas to maintain integrity of roof assembly.

O. Install valves in accordance with Section 23 05 23.

P. Install hydronic piping specialties in accordance with Section 23 21 16.

Q. Insulate piping. Refer to Section 23 07 00.

R. Install pipe identification in accordance with Section 23 05 53.

3.4 INSTALLATION - HEATING PIPING SYSTEMS

A. Install heating water piping in accordance with ASME B31.1 and ASME B31.9.

3.5 INSTALLATION - POLYPROPYLENE PIPING SYSTEMS

A. Piping Applications:

1. Install listed pipe materials and joining methods below in the following applications:

a. Underground, Service Entrance Piping: Polypropylene (PP-R) piping in SDR 7.4 or heavier.
b. Aboveground: Polypropylene (PP-R) piping in SDR 6, 7.4 or 11 based on the required minimum pressure rating and use temperature.

B. Fusion Welding of Joints:

1. Install fittings and joints using socket-fusion, elecrofusion, or butt-fusion as applicable for the fitting or joint type. All fusion-weld joints shall be made in accordance with the pipe and fitting manufacturer's specifications and product standards.
2. Fusion-weld tooling, welding machines, and electrofusion devices shall be as specified by the pipe and fittings manufacturer.
3. Prior to joining, the pipe and fittings shall be prepared in accordance with F 2389 and the manufacturer's specifications.
4. Joint preparation, setting and alignment, fusion process, cooling times and working pressure shall be in accordance with the pipe and fitting manufacturer's specifications.

C. Valve Applications:

1. Install gate valves close to main on each branch and riser serving 2 or more equipment connections and where indicated.
2. Install gate or ball valves on inlet to each equipment item and elsewhere as indicated.
3. Install drain valve at base of each riser, at low points of horizontal runs, and where required to drain hydronic piping system.
4. Install swing check valve on discharge side of each pump and elsewhere as indicated.
5. Install ball valves in each hot-water circulating loop and discharge side of each pump.

D. Piping Installations:

1. Install hangers and supports at intervals specified in the applicable Plumbing or Mechanical Code and as recommended by pipe manufacturer.
2. Support vertical piping at each floor and as specified in the applicable Plumbing or Mechanical Code.
3. Fire stopping shall be provided to both be compatible with the polypropylene piping and meet the requirements of ASTM E 814 or ULC S115 , "Fire Tests of Through-Penetration Firestops". Pipe insulations or fire resistive coating shall be removed where the pipe passes through a fire stop and, if required by the firestop manufacturer, for 3 inches beyond the firestop outside of the fire barrier.

4. When installed in systems with pumps in excess of 7.5 HP, piping shall be protected from excessive heat generated by operating the pump at shut-off conditions. Where the possibility exists that the pump will operate with no flow, the protection method shall be a temperature relief valve or comparable level of protection, set to a maximum temperature of 185°F.
5. If heat tracing is specified for the piping, it should be installed on the pipe interior or exterior, and it must be suitable for use with plastic piping and self-regulating to ensure the surface temperature of the pipe and fittings will not exceed 70°C (158°F).

E. Inspecting and Cleaning:

1. The pipes should be flushed with cold water after finishing the installation. Inspect and test piping systems following procedures of authorities having jurisdiction and as specified by the piping system manufacturer.

3.6 INSTALLATION - GAS PIPING SYSTEMS

A. Install natural gas piping in accordance with NFPA 54.

B. Provide support for utility meters in accordance with requirements of utility company.

C. Install vent piping from gas pressure reducing valves to outdoors and terminate in weatherproof hood.

D. Install gas pressure regulator vent full size opening on regulator and terminate outdoors as indicated on Drawings.

E. Provide PVC sleeve per detail on drawings for Gas Piping below floor slab.

F. Wire brush and paint all natural gas piping and supports exposed to building exterior with 2 coats rust resistant paint.

3.7 FIELD QUALITY CONTROL

A. See Division 01 for project requirements.

B. Test heating water piping system in accordance with ASME B31.9.

C. Pressure test natural gas piping in accordance with NFPA 54.

3.8 PIPE TESTING

A. General:

1. Before final acceptance of all piping systems, all systems must be tested in accordance with the schedule and prove to be free of leaks.

a. Perform tests under observation of Architect/Engineer.
b. Remove, replace or satisfactorily repair defective work revealed by tests.
c. Make piping repairs with new materials; caulking of screwed joints or pin holes is not permitted.
d. Furnish all test equipment and materials for testing.
e. Owner to furnish water for testing and flushing.

B. Testing Material:

1. Testing Medium:

a. Hydrostatic Testing Medium: Clean Water.
b. Pneumatic Testing Medium: Clean compressed air.

2. Pressure Testing Gauges: ANSI B40.1, Grade AA; minimum 6 inch diameter dial with scale divisions equal or less than maximum allowable pressure drop.

C. Testing Systems:

1. Hydrostatic and Pneumatic Testing Requirements:

a. Hydrostatic and pneumatic tests apply to piping indicate as scheduled is Paragraph B.
b. Pressure to be raised gradually to given value; then block off tight at source.
c. Allowable Pressure Drop: Maximum amount scheduled during corresponding minimum time interval.

1) Visually examine all joints during test.

d. Upon successful completion and test approval, relieve piping of pressure, drain, put into normal operation.

2. Hydrostatic and Pneumatic Testing Schedule:

Service	Normal Work Pressure psig	Hydrostatic Test Pressure psig	Pneumatic Test Pressure psig	Maximum Allowable Pressure Drop psig	Min. Test Time Hours
1. Heating Water:					
Heating Water	To 100	150	---	2	2
2. Fuel:					
Natural Gas	To 100	___	100	0	8

D. Cleaning and Adjusting:

1. Cleaning: Thoroughly clean all parts of the piping installation at completion of work.

a. Remove grease, metal cutting and sludge form all equipment, pipes, valves all fittings.
b. Repair all stoppages, discoloration or other damage to finish, furnishings or parts of building that are due to Contractor's failure to properly clean piping system.

c. After completion, fill, clean, and treat heating water piping system piping. Refer to Section 23 25 00.

2. Adjusting:

a. Adjust valves and other parts of work for quiet operation.
b. Adjust control devices for proper operation.
c. Demonstrate to Architect/Engineer satisfactory operation following adjustment.
d. Readjust or replace all items not functioning properly.

END OF SECTION 23 05 03

SECTION 23 05 23 - GENERAL DUTY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Ball valves.
2. Gas valves.

1.3 REFERENCES

A. ASTM International:

1. ASTM A216 - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
2. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
3. ASTM D4101 - Standard Specification for Propylene Injection and Extrusion Materials.

B. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 67 - Butterfly Valves.
2. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
3. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
4. MSS SP 78 - Cast Iron Plug Valves, Flanged and Threaded Ends.
5. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
6. MSS SP 85 - Cast Iron Globe & Angle Valves, Flanged and Threaded.
7. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

C. Underwriters Laboratories Inc.:

1. UL 842 - Valves for Flammable Fluids.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Submit manufacturers catalog information with valve data and ratings for each service.

C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of valves.

C. Operation and Maintenance Data: Submit installation instructions, spare parts lists, exploded assembly views.

1.6 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

C. Provide temporary protective coating on cast iron and steel valves.

1.9 ENVIRONMENTAL REQUIREMENTS

A. See Division 01 for project requirements.

1.10 WARRANTY

A. See Division 01 for project requirements.

1.11 EXTRA MATERIALS

A. See Division 01 for project requirements.

B. Furnish two packing kits for each size valve, or one additional valve of each size where packing kits are not available.

PART 2 - PRODUCTS

2.1 MANUFACTURERS (unless noted otherwise):

A. Milwaukee.

B. Nibco.

C. Stockham.

D. Apollo.

E. Bray.

2.2 BALL VALVES

A. Application: Control and isolation valves, hydronic systems.

1. Isolation: 2 inches and Smaller: MSS SP 110, 400 psi WOG, one piece bronze body, chrome plated brass ball, full port, teflon seats, blow-out proof stem, solder ends, lever handle.
2. Control: 2 inches and Smaller: MSS SP 110, Class 150 (200 psi), bronze, two piece body, type 316 stainless steel ball, regular port, teflon seats, blow-out proof stem, solder ends.

B. Application: Isolation valves, low pressure steam systems (up to 15 psi).

1. 2 inches and Smaller: MSS SP 110, Class 150, bronze, two piece body, type 316 stainless steel ball with vent hole, full port, reinforced teflon seats, stainless steel stem, threaded ends, lever handle.

C. Application: Isolation and control, steam systems (up to 125 psi) and corrosive gas systems.

1. 2 inches and Smaller: MSS SP 110, Class 150 Stainless steel, two piece body, stainless steel ball, reinforced teflon seats and stuffing box ring, threaded ends, lever handle.

D. Application: Miscellaneous piping systems.

1. PVC: 2 inches and Smaller: 150 psi at 73 degrees F water temperature, maximum service temperature: 140 degrees F ASTM D1784 PVC body and ball, double lever handle, EPDM seals, teflon seats, full port, double union type with socket ends.
2. CPVC: 2 inches and Smaller: 150 psi at 73 degrees F water temperature, maximum service temperature: 210 degrees F, ASTM D1784 CPVC body and ball, double lever handle, EPDM seals, teflon seats, full port, double union type with socket ends.
3. Polypropylene piping systems: 2 inches and Smaller: 150 psi at 100 degrees F water temperature, maximum service temperature 180 degrees F, ASTM D4101 natural polypropylene body and ball, double lever handle, EPDM seals, teflon seats, full port, double union type with socket ends.
4. Polypropylene piping systems: 2 inches and Smaller: 150 psi at 73 degrees F water temperature, maximum service temperature, 180 degrees F, ASTM D4101 black polypropylene body and ball, double lever handle, EPDM seals, teflon seats, full port, double union type with socket ends.

E. Application: Isolation, gas systems.

1. 1/4 inch to 3 inch: MSS SP 110, Class 125, two piece, threaded ends, bronze body, chrome plated bronze ball, reinforced teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, conventional port.

2.3 GAS VALVES

A. Acceptable Manufacturers:

1. Homestead.
2. Apollo.
3. Milwaukee.
4. Nibco.
5. Eclipse.
6. Rockwell.

B. Up To and Including 2 Inches: Apollo Series 80 ball valve or equal, bronze one piece body, stainless steel ball, Teflon seats and stuffing box ring, lever handle, solder ends.

C. Over 2 Inches: Homestead Figure 612 plug valve or equal. Valves are to be of the lubricated plug type, without taper, and with close tolerance between the plug and body sealing surfaces. Valves are to have a stem seal of reinforced Teflon. Valves must have a leak-proof, spring loaded ball and lubricant sealed check valve; and combination lubricant screw and button head fitting to prevent foreign matter from being forced into lubricant system. Valve plugs are to be floated on low-friction Teflon surfaces for extra ease of turning (the lower surface to also act as a means of minimizing torsional stress in the spring) and are to have port area equal to 100% of the area of standard pipe (or standard opening if desired). Valves are to be so constructed that lubricant system has sufficient pressure to force lubricant over all seating surfaces. Extruded Lubricant around stem is to be positive indication that lubricant system is full, and that there had been a minimum contamination of line fluids

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

B. Verify piping system is ready for valve installation.

3.2 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install 3/4 inch ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

D. Install valves with clearance for installation of insulation and allowing access.

E. Provide access where valves and fittings are not accessible.

F. Refer to Section 23 05 29 for pipe hangers.

G. Refer to Section 23 07 00 for insulation requirements for valves.

H. Refer to Section 23 05 03 for piping materials applying to various system types.

3.3 VALVE APPLICATIONS

A. Install shutoff and drain valves at locations indicated on Drawings in accordance with this Section.

B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

C. Install ball valves for throttling, bypass, or manual flow control services.

END OF SECTION 23 05 23

SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Pipe hangers and supports.
2. Hanger rods.
3. Inserts.
4. Flashing.
5. Equipment curbs.
6. Roof mounted piping supports.
7. Sleeves.
8. Mechanical sleeve seals.
9. Formed steel channel.
10. Firestopping relating to HVAC work.
11. Firestopping accessories.

1.3 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME B31.5 - Refrigeration Piping.
2. ASME B31.9 - Building Services Piping.

B. ASTM International:

1. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
3. ASTM E814 - Test Method of Fire Tests of Through Penetration Firestops.
4. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
5. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

C. American Welding Society:

1. AWS D1.1 - Structural Welding Code - Steel.

D. FM Global:

1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.

E. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

F. Underwriters Laboratories Inc.:

1. UL 263 - Fire Tests of Building Construction and Materials.
2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
3. UL 1479 - Fire Tests of Through-Penetration Firestops.
4. UL 2079 - Tests for Fire Resistance of Building Joint Systems.
5. UL - Fire Resistance Directory.

G. Intertek Testing Services (Warnock Hersey Listed):

1. WH - Certification Listings.

1.4 DEFINITIONS

A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.5 SYSTEM DESCRIPTION

A. Firestopping Materials: ASTM E119, ASTM E814, UL 263, and UL 1479 to achieve fire ratings of adjacent construction.

B. Surface Burning: ASTM E84 and UL 723 with maximum flame spread / smoke developed rating of 25/50.

C. Firestop interruptions to fire rated assemblies, materials, and components.

1.6 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 SUBMITTALS

A. See Division 01 for project requirements.

B. Shop Drawings: Indicate system layout with location including critical dimensions, sizes, and pipe hanger and support locations and detail of trapeze hangers.

C. Product Data:

1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
2. Firestopping: Submit data on product characteristics, performance and limitation criteria.

D. Firestopping Schedule: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.

E. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers. Indicate calculations used to determine load carrying capacity of trapeze, multiple pipe, and riser support hangers.

F. Manufacturer's Installation Instructions:

1. Hangers and Supports: Submit special procedures and assembly of components.
2. Firestopping: Submit preparation and installation instructions.

G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

H. Engineering Judgements: For conditions not covered by UL or WH listed designs, submit judgements by licensed professional engineer suitable for presentation to authority having jurisdiction for acceptance as meeting code fire protection requirements.

1.8 QUALITY ASSURANCE

A. Through Penetration Firestopping of Fire Rated Assemblies: UL 1479 or ASTM E814 with 0.10 inch water gage (24.9 Pa) minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.

1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
2. Floor and Roof Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.

a. Floor Penetrations Within Wall Cavities: T-Rating is not required.

B. Through Penetration Firestopping of Non-Fire Rated Floor and Roof Assemblies: Materials to resist free passage of flame and products of combustion.

1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.

2. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.10 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

1.11 ENVIRONMENTAL REQUIREMENTS

A. See Division 01 for project requirements.

B. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F (15 degrees C).

C. Maintain this minimum temperature before, during, and for minimum 3 days after installation of firestopping materials.

D. Provide ventilation in areas to receive solvent cured materials.

1.12 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Manufacturers:

1. Unistrut.
2. Grinnell.
3. B-Line.

B. Hydronic Piping:

1. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69, and MSS SP89.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (13 to 38 mm): Malleable iron or carbon steel, adjustable swivel, split ring.

3. Hangers for Hot Pipe Sizes 2 to 4 inches (50 to 100 mm): Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 6 inches (150 mm) and Larger: Adjustable steel yoke, cast iron roll, double hanger.
5. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
6. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 inches (150 mm) and Larger: Steel channels with welded spacers and hanger rods, cast iron roll.
7. Wall Support for Pipe Sizes 3 inches (76 mm) and Smaller: Cast iron hooks.
8. Wall Support for Pipe Sizes 4 inches (100 mm) and Larger: Welded steel bracket and wrought steel clamp.
9. Wall Support for Hot Pipe Sizes 6 inches (150 mm) and Larger: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
10. Vertical Support: Steel riser clamp.
11. Floor Support for Hot Pipe Sizes 4 Inches (100 mm) and Smaller: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
12. Floor Support for Hot Pipe Sizes 6 inches (150 mm) and Larger: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
13. Copper Pipe Support: Copper-plated, carbon steel ring.

C. Refrigerant Piping:

1. Conform to ASME B31.5, ASTM F708, MSS SP58, MSS SP69, and MSS SP89.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (13 to 38 mm): Malleable iron or carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 inches (50 mm) and Larger: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes 3 inches (75 mm) and Smaller: Cast iron hook.
6. Wall Support for Pipe Sizes 4 inches (100 mm) and Larger: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Copper-plated carbon-steel ring.

2.2 DUCT HANGERS

A. Round duct hangers:

1. 20 gauge galvanized metal.
2. 1/4" - 20 x 1" carriage bold with zinc plated wing nut and lock washer.
3. Diameter to match duct.

B. Wire rope duct hangers:

1. Steel core, aircraft quality, zinc coated wire.
2. Zinc coated hardened steel clamp system to prevent wire slippage.

C. Formed Steel Channel:

1. Product Description: Galvanized 12 gage (2.8 mm) thick steel. With holes 1-1/2 inches (38 mm) on center.

D. Strapping Hanger:

1. 18 gauge hot-dipped galvanized steel, 1" wide.

2.3 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded on one end, or continuous threaded.

2.4 INSERTS

A. Manufacturers:

1. Hilti.
2. Liebig.
3. Williams.

B. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.5 FLASHING

A. Metal Flashing: 26 gage (0.5 mm) thick galvanized steel.

B. Metal Counterflashing: 22 gage (0.8 mm) thick galvanized steel.

C. Caps: Steel, 22 gage (0.8 mm) minimum; 16 gage (1.5 mm) at fire resistant elements.

2.6 EQUIPMENT CURBS

A. Manufacturers:

1. Thy Curb.
2. Pate.
3. Vent Products.
4. Same manufacturer as the equipment supported.

B. Fabrication:

1. All curbs to be installed with 1-1/2 inch thick three pound density rigid insulation with aluminum liner.
2. Curbs to be minimum 18 gage welded galvanized steel construction. Curb internally reinforced, factory installed wood nailers.
3. Provide curbs to meet roof pitch, insulation thickness and type of roof deck specified. Contractor responsible for determining cant requirements, insulation thickness and pitch requirements.
4. Top of all roof curbs shall be level, with pitch built into curb when deck slopes 1/4 inch per foot or greater.
5. Minimum height of curb to be 12 inches above roof deck, where not indicated otherwise on plans.
6. Refer to schedules for specialty curbs.

2.7 ROOF MOUNTED PIPING AND CONDUIT SUPPORTS

A. Acceptable Manufacturer: Miro Industries, (800) 768-6978.

B. Roller bearing pipe support to absorb thermal expansion of piping. Support shall consist of a one piece rigid poly carbonate resin base/pipe support/roller housing, a self lubricating roller seat made from Teflon sheet, and a nylon roller which rests on the Teflon seat within the roller housing.

C. Base shall have rounded corners to prevent gouging of roof. Edges shall be raised 2" to provide a platform whereby different elevations may be achieved by stacking several pipe stands upon each other.

D. Base shall be 7 1/2" x 7 1/2" and have two 1/2" drainage ports to prevent ponding within device.

E. Provide multiple extensions as required to keep pipe level as roof pitches.

2.8 SLEEVES

A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage (1.2 mm) thick galvanized steel.

B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage (1.2 mm) thick galvanized steel.

C. Sleeves for Round Ductwork: Galvanized steel.

D. Sleeves for Rectangular Ductwork: Galvanized steel or wood.

E. Sealant: UL rated, non-combustible flexible sealant with fire stop properties, ASTM E814.

2.9 MECHANICAL SLEEVE SEALS

A. Manufacturers:

1. Thunderline Link-Seal, Inc.
2. Metraflex.
3. Flexicraft.

B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.10 FORMED STEEL CHANNEL

A. Manufacturers:

1. Allied Tube & Conduit Corp.
2. B-Line Systems.
3. Midland Ross Corporation, Electrical Products Division.
4. Unistrut Corp.

B. Product Description: Galvanized 12 gage (2.8 mm) thick steel. With holes 1-1/2 inches (38 mm) on center.

2.11 FIRESTOPPING

A. Manufacturers:

1. Dow Corning Corp.
2. Fire Trak Corp.
3. Hilti Corp.
4. International Protective Coating Corp.
5. 3M fire Protection Products.
6. Specified Technology, Inc..

B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.

1. Silicone Firestopping Elastomeric Firestopping: Single or Multiple component silicone elastomeric compound and compatible silicone sealant.
2. Foam Firestopping Compounds: Single or Multiple component foam compound.
3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
7. Firestop Pillows: Formed mineral fiber pillows.

2.12 FIRESTOPPING ACCESSORIES

A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.

B. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

C. General:

1. Furnish UL listed products.
2. Select products with rating not less than rating of wall or floor being penetrated.

D. Non-Rated Surfaces:

1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where piping is exposed.
2. For exterior wall openings below grade, furnish mechanical sealing device to continuously fill annular space between piping and cored opening or water-stop type wall sleeve.

2.13 PEX SUPPORT CHANNEL

A. 22-ga sheet metal channel listed and label by manufacturer PEX manufacturer for increased hanger spacing and plenum installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

B. Verify openings are ready to receive sleeves.

C. Verify openings are ready to receive firestopping.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

B. Remove incompatible materials affecting bond.

C. Obtain permission from Architect/Engineer before drilling or cutting structural members.

3.3 INSTALLATION - INSERTS

A. Install inserts for placement in concrete forms.

B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches (100 mm) and larger.

D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.4 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Install in accordance with ASME B31.1, ASME B31.5, ASME 31.9, ASTM F708, MSS SP 58, MSS SP 69, and MSS SP 89.

B. Support horizontal piping as scheduled.

C. Install hangers with minimum 1/2 inch (13 mm) space between finished covering and adjacent work.

D. Place hangers within 12 inches (300 mm) of each horizontal elbow.

E. Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment.

F. Support vertical piping at every floor.

G. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

H. Support riser piping independently of connected horizontal piping.

I. Provide sheet lead packing between hanger or support and piping.

J. Design hangers for pipe movement without disengagement of supported pipe.

K. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

L. Provide clearance in hangers and from structure and other equipment for installation of insulation.

3.5 INSTALLATION - DUCT HANGERS AND SUPPORTS

A. Install in accordance with current SMACNA manual.

B. Support horizontal ductwork as scheduled.

C. Install hangers with minimum 1/2 inch (13 mm) space between finished covering and adjacent work.

D. Place hangers/supports within 12 inches (300 mm) of each horizontal elbow.

E. Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment.

F. Support vertical ductwork at every floor.

G. Where ductwork is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

H. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, shafts, and suspended ceiling spaces are not considered exposed.

I. Provide clearance in hangers and from structure and other equipment for installation of insulation.

3.6 INSTALLATION - FLASHING

A. Provide flexible flashing and metal Counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

B. Provide curbs for roof installations minimum 12 inches high above roofing surface. Flash and counter-flash with sheet metal; seal watertight. Attach Counterflashing to equipment and lap base flashing on roof curbs. Flatten and solder joints.

C. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

3.7 INSTALLATION - SLEEVES

A. Exterior watertight entries: Seal with mechanical sleeve seals.

B. Set sleeves in position in forms. Provide reinforcing around sleeves.

C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

D. Extend sleeves through floors 1 inch (25 mm) above finished floor level. Caulk sleeves.

E. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with stuffing or firestopping insulation and caulk air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

F. Install chrome plated steel or stainless steel escutcheons at finished surfaces.

3.8 INSTALLATION - FIRESTOPPING

A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, and other items, requiring firestopping.

B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.

C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.

D. Compress fibered material to maximum 40 percent of its uncompressed size, place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.

E. Fire Rated Surface:

1. Seal opening at floor, wall, partition, ceiling, and roof as follows:

    a. Install sleeve through opening and extending beyond minimum of 1 inch (25 mm) on both sides of building element.
    b. Size sleeve allowing minimum of 1 inch (25 mm) void between sleeve and building element.
    c. Pack void with backing material.
    d. Seal ends of sleeve with UL listed fire resistive silicone compound to meet fire rating of structure penetrated.

F. Non-Rated Surfaces:

1. Seal opening through non-fire rated wall, partition, floor, ceiling, and roof opening as follows:

    a. Install sleeve through opening and extending beyond minimum of 1 inch (25 mm) on both sides of building element.
    b. Size sleeve allowing minimum of 1 inch (25 mm) void between sleeve and building element.
    c. Install type of firestopping material recommended by manufacturer.

2. Install escutcheons where conduit or piping penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
3. Exterior wall openings below grade: Assemble rubber links of mechanical sealing device to size of piping and tighten in place, in accordance with manufacturer's instructions.
4. Interior partitions: Seal pipe penetrations at clean rooms, laboratories, hospital spaces, computer rooms, telecommunication rooms, and data rooms. Apply sealant to both sides of penetration to completely fill annular space between sleeve and conduit.

3.9 FIELD QUALITY CONTROL

A. See Division 01 for project requirements.

B. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.10 CLEANING

A. See Division 01 for project requirements.

B. Clean adjacent surfaces of firestopping materials.

3.11 PROTECTION OF FINISHED WORK

A. See Division 01 for project requirements.

B. Protect adjacent surfaces from damage by material installation.

3.12 SCHEDULES (STEEL/COPPER/PVC/PEX)

PIPE SIZE Inches	MAX. HANGER SPACING Feet	HANGER ROD DIAMETER Inches
1/2 to 3/4	5	3/8
1	6	3/8
1-1/4	7	3/8
1-1/2 to 2	8	3/8
2-1/2	9	1/2
3	12	1/2
4	14	5/8
5	16	5/8
6	17	3/4
8	19	3/4
10	22	7/8
12	23	7/8
14	25	1
16	27	1
18	28	1
20	30	1-1/4

24	32	1-1/4
PVC (All Sizes)	6	3/8
PEX 1" and below (without support channel)	2.5	3/8
1 1/2" and above (without support channel)	4	3/8
1" and below (with support channel)	8	3/8
1 1/2" and below (with support channel)	8	3/8

3.13 SCHEDULES (POLYPROPYLENE)

PIPE SIZE Inches	MAX. HANGER SPACING Feet	HANGER ROD DIAMETER Inches
SDR-11: 1/2 to 1 1/2	4	3/8
SDR-11: 2 to 3	5	3/8
SDR-17.6: 6 to 14	5	3/8
SDR-11: 4 to 10	6	3/8
SDR-17.6: 16 to 18	6	3/8
SDR-11: 12 to 14	7	3/8
SDR-17.6: 20 to 24	7	3/8
SDR-11: 16	9	3/8
SDR-11: 18	10	3/8

3.14 SCHEDULES (DUCTWORK)

ROUND DUCT Area (Diameter)	MAX. HANGER SPACING Feet	HANGER ROD DIAMETER Inches
Less than 5"	8	3/8 or Wire Rope
6" to 26"	6	3/8 or Wire Rope
28" to 38"	6	1/2 or Wire Rope
More than 38"	4	1/2 or Wire Rope
Flexible Ductwork (all sizes)	As directed by manufacturer, but not less than 4'	3/8 or Wire Rope

RECTANGULAR DUCT Area (Square Feet)	MAX. HANGER SPACING Feet	HANGER ROD DIAMETER Inches
Less than 0.15 sq.ft.	8	Channel support with 3/8 rod or Strap
0.15 to 3 sq. ft.	6	Channel support with 3/8 rod or Strap
3 to 7 sq. ft.	6	Channel support with 3/8 rod
More than 7 sq. ft.	4	Channel support with 1/2 rod

VERTICAL DUCTS	MAX. HANGER SPACING Feet
Round Ducts	12
Rectangular	10

END OF SECTION 23 05 29

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING, DUCTWORK, AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Nameplates.
2. Tags.
3. Pipe markers.
4. Ductwork Labels.

1.3 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Submit manufacturers catalog literature for each product required.

C. Shop Drawings: Submit list of wording, symbols, letter size, and color coding for mechanical identification and valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

D. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.6 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 EXTRA MATERIALS

A. See Division 01 for project requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Kolbi.

B. Brady Corporation.

C. Seton.

D. Substitutions: Company Specializing in piping, ductwork and equipment identification with minimum 5 years experience.

2.2 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.3 TAGS

A. Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inches (38 mm) diameter.

B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inches (38 mm) diameter with finished edges.

C. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum frame.

2.4 PIPE MARKERS

A. Color and Lettering: Conform to ASME A13.1.

B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.

C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

D. Plastic Underground Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches (150 mm) wide by 4 mil (0.10 mm) thick, manufactured for direct burial service.

2.5 DUCTWORK LABELS

A. Description: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings. Minimum size 12"x3".

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions on both new and existing pipes within project area.

D. Identify all new equipment (as well as existing equipment to remain referenced in temperature controls sequence of operation) including fan powered boxes, domestic water heaters, backflow preventer, air handling units, gas shut off valves, duct free split system, air compressors, air cooled condensers, rooftop units, air terminal units, supply fan, exhaust fans, return fans, intake hoods, pumps, relief hoods, etc. with plastic nameplates. Small devices may be identified with tags.

E. In addition to providing engraved plastic nameplates on the FPB boxes, provide engraved plastic nameplates on the ceiling grid below the box. The nameplate shall be no wider than the width of the grid (white with black letters).

F. Identify control panels and major control components outside with plastic nameplates.

G. Identify thermostats with plastic nameplates.

H. Identify valves in main and branch piping with tags.

I. Identify piping, concealed or exposed, with plastic pipe markers. Identify service and flow direction. Install in clear view and align with axis of piping. Locate identification not to exceed 50 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

J. Identify ductwork with adhesive labels. Identify with air handling unit or rooftop unit identification number and service. Locate identification at air handling unit, main ductwork and on each side of wall or floor penetrations.

K. Provide engraved plastic nameplates on the ceiling grid below each fire damper, smoke damper, and fire/smoke damper access door. The nameplate shall be no wider than the width of the grid (white with black letters). The damper identification number shall match Hospital numbering system where dampers are individually identified.

3.3 VALVE CHART AND SCHEDULE

A. Provide valve chart and schedule in aluminum frame with clear plastic shield. Install at location directed by Owner.

END OF SECTION 23 05 53

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Testing adjusting, and balancing of air systems.
2. Testing adjusting, and balancing of hydronic systems.
3. Measurement of final operating condition of HVAC systems.

1.3 REFERENCES

A. Associated Air Balance Council:

1. AABC MN-1 - National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems.

C. Natural Environmental Balancing Bureau:

1. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Prior to commencing Work, submit proof of latest calibration date of each instrument.

C. Test Reports: Indicate data on AABC MN-1 National Standards for Total System Balance forms.

D. Field Reports: Indicate deficiencies preventing proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

E. Prior to commencing Work, submit report forms or outlines indicating adjusting, balancing, and equipment data required. Include detailed procedures, agenda, sample report forms.

F. Submit draft copies of report for review prior to final acceptance of Project.

G. Furnish a digital report, complete with table of contents page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

C. Operation and Maintenance Data: Furnish final copy of testing, adjusting, and balancing report inclusion in operating and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with AABC MN-1 National Standards for Field Measurement and Instrumentation, Total System Balance, ASHRAE 111, or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 QUALIFICATIONS

A. Agency: Company and personnel performing balancing shall specialize in testing, adjusting and balancing of systems specified in this section shall have a minimum of five years documented experience and certified by AABC, NEBB, or SMARTA

B. Agencies:

1. Aero Test and Balance.
2. Superior Test and Balance.

3. Mechanical Test and Balance.
4. International Test and Balance.
5. Synergy Mechanical.

C. Perform Work under supervision of AABC Certified Test and Balance Engineer, NEBB Certified Testing, Balancing and Adjusting Supervisor, or SMARTA Certified Testing, Balancing and Adjusting Supervisor.

1.9 SEQUENCING

A. See Division 01 for project requirements.

B. Sequence balancing between completion of systems tested and Date of Substantial Completion.

1.10 SCHEDULING

A. See Division 01 for project requirements.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

B. Verify systems are complete and operable before commencing work. Verify the following:

1. Systems are started and operating in safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place or in normal position.
15. Service and balancing valves are open.

3.2 PREPARATION

A. Furnish instruments required for testing, adjusting, and balancing operations.

B. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

3.3 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 10 percent of design.

B. Air Outlets and Inlets: Adjust total to within plus percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.4 ADJUSTING

A. See Division 01 for project requirements.

B. Verify recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. After adjustment, take measurements to verify balance has not been disrupted. If disrupted, verify correcting adjustments have been made.

E. Report defects and deficiencies noted during performance of services, preventing system balance.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by Owner.

3.5 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to obtain required or design supply, return, and exhaust air quantities.

B. Make air quantity measurements in main ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts.

E. Use volume control devices to regulate air quantities only to extent adjustments do not create objectionable air motion or sound levels. Effect volume control by using volume dampers located in ducts.

F. Vary total system air quantities by adjustment of fan speeds. Provide sheave drive changes to vary fan speed. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. At modulating damper locations, take measurements and balance at extreme conditions. Balance variable volume systems at maximum airflow rate, full cooling, and at minimum airflow rate, full heating.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to obtain required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near building entries.

M. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

N. For variable air volume system powered units set volume controller to airflow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable-air-volume temperature control.

O. On fan powered VAV boxes, adjust airflow switches for proper operation.

3.6 WATER SYSTEM PROCEDURE

A. Pressure dependent systems:

1. Adjust water systems, after air balancing, to obtain design quantities.
2. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow-metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in system.
3. Adjust systems to obtain specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
4. Effect system balance with automatic control valves fully open or in normal position to heat transfer elements.
5. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
6. Where available pump capacity is less than total flow requirements or individual system parts, simulate full flow in one part by temporary restriction of flow to other parts.

B. Pressure independent systems:

1. Adjust water systems, after air balancing, to obtain design quantities.
2. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow-metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in system.

3. Command open all pressure independent control valves via the building automation system if the total connected load matches the pump and system diversity equals 100%. Systems with less than 100% diversity need to have a percentage of valves closed to match pump capacity.
4. Ensure that all pumps designed to be in operation are on and commanded to 100% speed (or VFD control loop has high enough differential pressure setpoint to satisfy connected load in cases where pumps are sized for future loads).
5. Verify total system flow is at system design flow rate via accurate method.
6. Decrease the pump speed (or decrease differential pressure setpoint if under control) until a measurable flow decrease occurs.
7. Increase pump speed (or increase differential setpoint if under control) slowly until design flow is re-established. Set measured differential pressure to differential pressure setpoint on the BAS

3.7 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing:

1. Computer Room Air Conditioning Units.
2. Air Coils.
3. Terminal Heat Transfer Units.
4. Fans.
5. Air Filters.
6. Air Terminal Units.
7. Air Inlets and Outlets.

B. Report Forms

1. Title Page:

a. Name of Testing, Adjusting, and Balancing Agency
b. Address of Testing, Adjusting, and Balancing Agency
c. Telephone and facsimile numbers of Testing, Adjusting, and Balancing Agency
d. Project name
e. Project location
f. Project Architect
g. Project Engineer
h. Project Contractor
i. Project altitude
j. Report date

2. Summary Comments:

a. Design versus final performance
b. Notable characteristics of system
c. Description of systems operation sequence
d. Summary of outdoor and exhaust flows to indicate building pressurization
e. Nomenclature used throughout report
f. Test conditions

3. Instrument List:

a. Instrument
b. Manufacturer

c. Model number
d. Serial number
e. Range
f. Calibration date

4. Electric Motors:

a. Manufacturer
b. Model/Frame
c. HP/BHP and kW
d. Phase, voltage, amperage; nameplate, actual, no load
e. RPM
f. Service factor
g. Starter size, rating, heater elements
h. Sheave Make/Size/Bore

5. V-Belt Drive:

a. Identification/location
b. Required driven RPM
c. Driven sheave, diameter and RPM
d. Belt, size and quantity
e. Motor sheave diameter and RPM
f. Center to center distance, maximum, minimum, and actual

6. Pump Data:

a. Identification/number
b. Manufacturer
c. Size/model
d. Impeller
e. Service
f. Design flow rate, pressure drop, BHP and kW
g. Actual flow rate, pressure drop, BHP and kW
h. Discharge pressure
i. Suction pressure
j. Total operating head pressure
k. Shut off, discharge and suction pressures
l. Shut off, total head pressure

7. Combustion Test (Verification Only):

a. Manufacturer
b. Model number
c. Serial number
d. Firing rate
e. Overfire draft
f. Gas meter timing dial size
g. Gas meter time per revolution
h. Gas pressure at meter outlet
i. Gas flow rate
j. Heat input
k. Burner manifold gas pressure
l. Percent carbon monoxide (CO)
m. Percent carbon dioxide (CO2)

n. Percent oxygen (O2)
o. Percent excess air
p. Flue gas temperature at outlet
q. Ambient temperature
r. Net stack temperature
s. Percent stack loss
t. Percent combustion efficiency
u. Heat output

8. Air Cooled Condensing Unit:

a. Identification/number
b. Location
c. Manufacturer
d. Model number
e. Serial number
f. Entering DB air temperature, design and actual
g. Leaving DB air temperature, design and actual
h. Number of compressors

9. Air Moving Equipment:

a. Location
b. Manufacturer
c. Model number
d. Serial number
e. Arrangement/Class/Discharge
f. Air flow, specified and actual
g. Return air flow, specified and actual
h. Outside air flow, specified and actual
i. Total static pressure (total external), specified and actual
j. Inlet pressure
k. Discharge pressure
l. Sheave Make/Size/Bore
m. Number of Belts/Make/Size
n. Fan RPM

10. Return Air/Outside Air Data:

a. Identification/location
b. Design air flow
c. Actual air flow
d. Design return air flow
e. Actual return air flow
f. Design outside air flow
g. Actual outside air flow
h. Return air temperature
i. Outside air temperature
j. Required mixed air temperature
k. Actual mixed air temperature
l. Design outside/return air ratio
m. Actual outside/return air ratio

11. Exhaust Fan Data:

a. Location
b. Manufacturer
c. Model number
d. Serial number
e. Air flow, specified and actual
f. Total static pressure (total external), specified and actual
g. Inlet pressure
h. Discharge pressure
i. Sheave Make/Size/Bore
j. Number of Belts/Make/Size
k. Fan RPM

12. Duct Leak Test:

a. Description of ductwork under test
b. Duct design operating pressure
c. Duct design test static pressure
d. Duct capacity, air flow
e. Maximum allowable leakage duct capacity times leak factor
f. Test apparatus

1) Blower
2) Orifice, tube size
3) Orifice size
4) Calibrated

g. Test static pressure
h. Test orifice differential pressure
i. Leakage

13. Terminal Unit Data:

a. Manufacturer
b. Type, constant, variable, single, dual duct
c. Identification/number
d. Location
e. Model number
f. Size
g. Minimum static pressure
h. Minimum design air flow
i. Maximum design air flow
j. Maximum actual air flow
k. Inlet static pressure

14. Air Distribution Test Sheet:

a. Air terminal number
b. Room number/location
c. Terminal type
d. Terminal size
e. Area factor
f. Design velocity
g. Design air flow
h. Test (final) velocity
i. Test (final) air flow

j. Percent of design air flow

END OF SECTION 23 05 93

SECTION 23 07 00 - HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Piping system insulation.
2. Pipe insulation jackets.
3. Insulation accessories including vapor retarders and accessories.
4. Ductwork insulation.
5. Ductwork insulation jackets.
6. Duct liner.
7. Insulation accessories including vapor retarders and accessories.

1.3 REFERENCES

A. ASTM International:

1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
2. ASTM C335 - Standard Test Method for Steady-State Heat Transfer Properties of Pipe Insulation.
3. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
4. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.
5. ASTM C518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
6. ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
7. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.
8. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
9. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
10. ASTM C921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
11. ASTM C1071 - Standard Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material).
12. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
13. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.

14. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
15. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

B. Sheet Metal and Air Conditioning Contractors':

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.

C. Manufacturer's Installation Instructions: Submit manufacturers published literature indicating proper installation procedures.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

C. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.8 ENVIRONMENTAL REQUIREMENTS

A. See Division 01 for project requirements.

B. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

C. Maintain temperature during and after installation for minimum period of 24 hours.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 PIPING INSULATION

A. Mineral Fiber - Type 'A':

1. Manufacturers:

a. Johns-Manville.
b. Owens Corning Fiberglass.
c. Knauf Insulation.
d. Certainteed Corp.

2. Insulation: ASTM C547 Type 1 or Type IV, UL Classified, Mineral Fiber Pipe Insulation, Type I, 850 degrees F.

a. “k” factor: ASTM C335, 0.23 BTU-in./hr*ft^2*F at 75 degrees F. mean temperature.
b. Maximum service temperature: 850 degrees F.
c. Maximum moisture absorption: 0.5 percent by weight.
d. Maximum water vapor sorption: 0.2% by volume.

3. Vapor Retarder Jacket:

a. Vapor barrier jacket shall be cleanable with wet soapy cloth, and paintable. Vapor retarder jacket shall meet the minimum requirements of ASTM C1136 Type I, II, III, IV, and VIII. Jacket shall be certified to meet the requirements of UL723 and meet the requirements of NFPA 255.
b. Moisture vapor transmission: ASTM E96, Procedure A; 0.02 perm-inches.

4. Field Applied Vapor Retarder Lap Adhesive:

a. Compatible with insulation jacketing.

5. Insulating Cement/Mastic:

a. Manufacturers:

1) Fibrex.
2) Dabco.
3) Manufacturer specializing in insulating cement/mastic with minimum five years documented experience.

b. ASTM C195; hydraulic setting on mineral wool.

B. Flexible EPDM Elastomeric Foam Insulation Closed Cell - Type 'B'

1. Manufacturers:

a. Aeroflex USA Inc.; Aerocel EPDM Flexible, Elastomeric Foam Insulation.
b. Armacell LLC; Armaflex HT EPDM Flexible, Elastomeric Foam Insulation.
c. K-Flex HT: EPDM Flexible, Elastomeric Foam Insulation.

2. Preformed Flexible EPDM Elastomeric Cellular Thermal Insulation in Sheet Type II and Tubular form: ASTM C534; Type I, Tubular form

a. 'k' Value: ASTM C 518 / C177 .245 BTU-in./hr*ft 2*F at 75 degrees F.
b. Minimum Service Temperature: -297F
c. Maximum Service Temperature: 257 F self-seal or 300F degrees if Glued.
d. Maximum Moisture Absorption ASTM C209: 0.2 percent by volume.
e. Moisture Vapor Transmission: ASTM E96; 0.03 perm inches.
f. Maximum Flame Spread: ASTM E84; 25 Flame Development.
g. Maximum Smoke Developed: ASTM E84; 50 Smoke Development.
h. Connection: Waterproof manufacturer's approveled adhesive with EPDM Adhesive Tape on all glued joints and seams or Self-seal PSA with EPDM Lap and Butt Tap covering all joints
i. Pipe Supports: Aerofix Pipe Supports with EPDM Pro-Tape wrap on exterior pipe support

3. Flexible EPDM Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation using EPDM protape on all laps seams and Butt joints.

C. Polypropylene Piping Insulation - Type ‘C’

1. Manufacturers:

a. Aquatherm.

2. Insulation shall be a thermal (radiant, conductive, and convective) and vapor barrier. The thick wall, self insulating fittings do not require an additional vapor barrier for the piping system to meet this performance level. The thermal barrier is UV resistant, CFC-free, non-porous, non-fibrous, and resist mold growth. The pipe with the integral thermal barrier with standard unprotected fittings shall meet the ASTM E84 and the CAN/ULC S102.2 requirements for a Flame Spread Rating of 25 and Smoke Development rating of 50.

D. Calcium Silicate - Type 'D'

1. Manufacturers:

   a. John Mansville.
   b. Approved Equal

2. Industrial Insulation Group Thermo-12 Gold preformed calcium silicate pipe and block insulation with Corrosion Inhibitor.

   a. Complies with ASTM C533 Type 1 or 1A.
   b. Color coded to identify product as asbestos free.
   c. Manufactured in standard lengths of 36”(0.92m) with square cut ends.
   d. Conforms to the dimensional requirements of ASTM C585.
   e. Rated maximum service temperature of 1200°F (650°C).
   f. Maximum density of 15 lbs/ft³.
   g. Compressive strength of 100 psi minimum when tested in accordance with ASTM C165.
   h. Rated as 0 flame spread and 0 smoke developed when tested in accordance with ASTM E84, UL 723, CAN/ULC-S102-M88 or NFPA 255.
   i. Certified to meet the requirements of ASTM C795 for use over stainless steel.
   j. Rated as noncombustible when tested in accordance with ASTM E136.
   k. Effective corrosion inhibitor is equal to or better then DI water standard when tested in accordance with ASTM C1617.

3. Field Applied Aluminum Jacketing: 0.5” x 0.020” (13 x 0.5mm) Type 304 stainless steel bands and clips.
4. Accessories:

   a. Bands: 0.5” x 0.020” (13 x 0.5mm) Type 304 stainless steel or T-3003 H-14 Aluminum.
   b. Adhesives:

      1) Industrial Insulation Group CalBond Gold for calcium silicate to calcium silicate joints.
      2) Industrial Insulation Group CalCoat 127.

   c. Weather Protection: Industrial Insulation Group Insulkote ET for weather protective coating.
   d. Accessory materials shall be installed in accordance with project drawings and specifications, manufacturer’s instructions and in conformance with the current edition of MICA - “Commercial & Industrial Insulation Standards”, Process Industry Practices, or other recognized standards.

E. Pre-Insulated Pipe Shields:

1. Acceptable Manufacturers: Insulation Components Inc.'s, iShields or equal.
2. Pre-Insulating Pipe Shields at hangers with high-compressive strength insulation, suitable for conditions with material jacketing are required at each hanger location. They will provide water vapor retarding properties and service at required temperatures are to be used at all piping and support locations.(Absolutely, No Wood Blocks allowed).
3. All Pre-Insulated Pipe Shield should be clearly marked and labeled by the Manufacturer with Insulation Materials used and the dimensional sizes clearly marked.

    a. Cold Systems from -297 to 250 F: Must use High Density Phenolic Insulation on iShields, Polyiso on IShields or Cellar Glass iShields.(No Calcium Silicate Insulated Shields allowed on any cold piping sysems).
    b. Hot Systems above 250F: Must use Calcium Silicate up to 1200F or Cellar Glass up to 900 F
    c. Install insulation continuously through hangers and around anchor attachments.
    d. For insulation application where vapor barriers are indicated, extend insulation beyond the shield to aid with point of attachment to adjacent Insulation. Supported the iShield to point of attachment to structure, strut or clap.
    e. Use 360 or 180 degree shields based on hanger requirements.
    f. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
    g. Follow Manufacturer Recommendations for Compressive Strength required needed to handle load bearing weights.

2.2 DUCTWORK INSULATION

A. Manufacturers (unless noted otherwise):

1. Johns-Manville.
2. Owens Corning Fiberglass.
3. Knauf Insulation.
4. Certainteed Corp.

B. Mineral Glass Fiber, Flexible Blanket or Batts (GFF)

1. Insulation: ASTM C1290; Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

    a. Operating Temperatures: 250 degrees F.
    b. Density: 1.0 lb/cu ft.
    c. ‘K’ factor: ASTM C518, 0.27 at 75 degrees F.

2. Vapor Retarder Jacket: ASTM 1136, Type II Flexible and Low Permeance Vapor Retarders for Thermal Insulation.

    a. For systems operating at temperatures below ambient, close and secure seams and joints. When outward clinching staples are used, seal penetrations.
    b. Moister vapor transmission: ASTM E96; 0.04 perm.

3. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
4. Vapor Retarder Lap Adhesive:

    a. Compatible with insulation.

5. Insulating Cement/Mastic:

    a. Manufacturers:

        1) Fibrex.
        2) Dabco.
        3) Manufacturer specializing in insulating cement/mastic with minimum five years documented experience.

    b. ASTM C195; hydraulic setting on mineral wool.

C. Glass Fiber, Rigid (GFR)

1. Insulation: ASTM C612; rigid, noncombustible.

    a. 'K' factor: ASTM C177 or ASTM C518, 0.24 at 75 degrees F.
    b. Maximum Service Temperature: 450 degrees F.
    c. Maximum Moisture Absorption: 0.1 percent by volume.
    d. Density: 3.0 lb/cu ft.

2. Vapor Retarder Jacket: ASTM C1136 Flexible, Low Permeance Vapor Retarders for Thermal Insulation, Type II.

    a. Kraft paper reinforced with glass fiber yarn an bonded to aluminized film, with pressure sensitive rubber based adhesive.
    b. Moisture vapor transmission: ASTM E96; 0.04 perm.
    c. Secure with pressure sensitive tape.

3. Vapor Retarder Lap Adhesive:

    a. Compatible with insulation.

D. Glass Fiber Duct Liner, Flexible (GFL)

1. Insulation: ASTM C1071 Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material), Type I

    a. 'K' factor: ASTM C177, 0.24 at 75 degrees. F.
    b. Density: 1.5 lb/cu ft.
    c. Maximum velocity on coated air side: 6,000 fpm.

2. Adhesive:

    a. Waterproof, ASTM E162 fire-retardant type fibrous adhesive.

3. Liner Fasteners: Galvanized steel, self-adhesive pad, impact applied, or welded with impaling washers.

E. Elastomeric EPDM Duct Liner, Flexible (EDL)

1. Flexible closed-cell EPDM elastomeric closed-cell duct liner, meeting the requirements of ASTM C 1534 as follows:

    a. Type I - Closed cell, flat, in sheet or roll form, in thicknesses of 1/2" to 2" (13mm to 51mm) in 1/4" (13mm) increments. Maximum thermal conductivity at 75°F (24°C) mean temperature: 0.245 Btu·in/hr·ft2·°F.
    b. NRC rating of .20 at ½" thick, .35 at 1" thick, .40 at 1-1/2" thick, and .50 at 2" thick when tested by ASTM C 423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method. SAA values to be equal to or greater as follows: ½"=.22, 1"=.37, 1-1/2"=.36 and 2"=.47, using the same test method.
    c. EPDM Elastomeric Insulation material shall be manufactured without the use of CFC's, HFC's or HCFC's, is fiber free, dust free, and resists mold and moisture.
    d. EPDM elastomeric insulation is to be formaldehyde-free and provide no VOC emissions when tested in accordance with California Department of Health Services (CA DHS) Standard Practice for the Testing of Volatile Organic Emissions from Various Sources

2. Adhesive: Waterproof, ASTM E 916 fire-retardant type fibrous adhesive.
3. Liner Fasteners: Galvanized steel, self-adhesive pad, impact applied, or welded with impaling washers.

2.3 PIPE, DUCTWORK, AND EQUIPMENT JACKETS

A. PVC Plastic Pipe Jacket:

1. Application: Interior exposed piping.
2. Manufacturer: Proto PVC Corp. Model 'LoSmoke PVC' series or approved equal.
3. Product Description: ASTM D1784, One piece molded type fitting covers and sheet material, off-white color.
4. Thickness: 20 mil.
5. Connections: Brush on welding adhesive.

B. PVC Plastic Equipment Jacket:

1. Application: Interior equipment.
2. Product Description: Sheet material, off-white color.
3. Minimum Service Temperature: -40degrees F.
4. Maximum Service Temperature: 150 degrees F.
5. Moisture Vapor Transmission: ASTM E96; 0.002 perm-inches.
6. Thickness: 20 mil.
7. Connections: Compatible with insulation.

C. Covering Adhesive Mastic:

1. Compatible with insulation.

D. Canvas Equipment Jacket:

1. UL listed.
2. Fabric: 6 oz/sq yd, plain weave cotton.
3. Fire retardant lagging adhesive. Composite of insulation, jacket and lagging adhesive having flame spread index not greater than 25 and smoke developed index not greater than 50 when tested to ASTM E84.

E. Lagging Adhesive:

1. Compatible with insulation.

F. Five Ply Foil/Film Laminate Pipe or Ductwork Jacket:

1. Application: Exterior piping or ductwork.
2. Manufacturer:

a. Victory Clad

1) Aluminum Finish: Victory Clad VC500 Plus.
2) Stucco embossed finish: Victory Clad VC501 Plus.
3) Embossed White Finish: Victory Clad VC503 Plus.

b. VentureClad 1577CW

1) Aluminum Finish: 3M VentureClad 1577CW.
2) Stucco embossed finish: 3M VentureClad 1577CW-E.
3) White Finish: 3M VentureClad 1577CW-WM.

3. Material:

a. Jacketing material is to have a maximum flame spread/smoke developed index of 25/20, per ASTM-E 84 test, a .0000 water vapor permeance rating per ASTM E-96, and mold inhibitors incorporated. All products are UV stable.
b. UL 723.
c. Aluminum Finish: 7 to 14 mils thick 5 ply (3 Layers aluminum foil, 2 layers of polyester film) with zero perm water vapor permeability. UL listed.
d. Stucco/White Finish: 15 to 24 mils thick 13 ply multi-layered, laminate coated with a cold weather acrylic adhesive, resistance to weathering, fungi, UV and extreme environmental conditions
e. High Abuse Finish: 13ply Self-Adhesive Exterior where High Physical abuse can occur finish.

4. Joining: Special cold weather acrylic pressure sensitive adhesive system with minimum application temperature of -10 degrees F. Minimum 3" laps.
5. Painting: Follow manufacturer's recommended instructions
6. Manufacturer's Installation Instructions are available from manufacturer and should be supplied by bidding contractors.

G. Plenum Wrap

1. Manufacturers:

a. 3M Fire Barrier Plenum Wrap 5A
b. Thermal Ceramics FireMaster PlenumWrap+
c. Unifrax FyreWrap 0.5

2. Application: Interior pipe that does not meet required flame/smoke spread criteria.

3. Plenum wrap shall be utilized to enclose PVC or other plastic piping/cabling within building plenum spaces which would not otherwise comply with ASTM E84 flame spread and smoke developed requirements. Fire resistant wrap shall consist of an inorganic blanket encapsulated with a scrim-reinforced foil. It shall provide a flexible, non-combustible enclosure for cables and pipe in return air plenums as tested to UL 910. It shall be a non-asbestos wrap containing a safer fiber construction and install easily due to high flexibility and strength. It shall be soluble in the lungs according to EU 67/548/EWG, Note Q for biopersistence.
4. Physical and other characteristics:

    a. 1/2 in. minimum thickness, 24"x 50' or 48"x25', totally encapsulated with an aluminum foil scrim.
    b. Weight: 0.46 lbs./sq. ft.
    c. Maximum Flame Spread (Ft.) 0.01
    d. Maximum Smoke (Optical Density) 0.01
    e. Average Smoke (Optical Density) 0.00
    f. Surface Burning Characteristics (ASTM E 84)

        1) Foil Encapsulated Blanket: Flame Spread: 0; Smoke Developed: 0
        2) Blanket: Flame Spread: 0; Smoke Developed: 0

    g. Testing Approvals: ASTM C 411, ASTM C 518, ASTM E 84, ASTM E 136, UL 910
    h. Listed by Omega Point Laboratories Inc., Design Numbers: PP 100 F and PP 101 F

5. Installation materials

    a. Minimum 3/4" wide filament tape.
    b. Carbon steel or stainless steel banding material, minimum 1/2" wide, minimum 0.015" thick, with steel banding clips.
    c. 16 gauge steel tie wire as alternate for banding.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

B. Verify piping, equipment and ductwork has been tested before applying insulation materials.

C. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Exposed Piping: Locate insulation and cover seams in least visible locations.

B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints. Utilize pre-insulated pipe shields.

C. Mineral fiber insulated pipes conveying fluids below ambient temperature:

1. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.
2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.
3. Utilize pre-insulated pipe sheilds.

D. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

E. Mineral fiber insulated pipes conveying fluids above ambient temperature:

1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

F. Inserts and Shields:

1. Application: Piping or Equipment.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under finish jacket.
4. Insert configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be factory fabricated.
5. Insert material: Compression resistant insulating material suitable for planned temperature range and service.

G. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

H. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces: Finish with PVC jacket and fitting covers, aluminum jacket, or stainless steel jacket.

I. Exterior Piping Applications: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with five play foil/film jacket with seams located at 3 or 9 o'clock position on side of horizontal piping with overlap facing down to shed water or on bottom side of horizontal equipment.

J. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size insulation large enough to enclose pipe and heat tracer. Cover with aluminum or stainless steel jacket with seams located at 3 or 9 o'clock position on side of horizontal piping with overlap facing down to shed water.

K. Factory Insulated Equipment: Do not insulate.

L. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

M. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

N. Mineral fiber insulated equipment containing fluids below ambient temperature: Provide vapor retarder jackets, factory-applied or field-applied. Finish with glass-cloth and vapor barrier adhesive.

O. Mineral fiber insulated equipment containing fluids above ambient temperature: Provide standard jackets, with or without vapor retarder, factory-applied or field-applied. Finish with glass cloth and adhesive.

P. Finish insulation at supports, protrusions, and interruptions.

Q. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.

R. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

S. Insulated ductwork conveying air below ambient temperature:

1. Provide insulation with vapor retarder jackets.
2. Finish with tape and vapor retarder jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

T. Insulated ductwork conveying air above ambient temperature:

1. Provide with or without standard vapor retarder jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

U. Exterior Applications: Provide insulation with vapor retarder jacket. Cover with five ply foil/film outdoor jacket or with caulked aluminum jacket with seams located on bottom side of horizontal duct section.

V. External Duct Insulation Application:

1. Secure insulation with vapor retarder with wires and seal jacket joints with vapor retarder adhesive or tape to match jacket.
2. Secure insulation without vapor retarder with staples, tape, or wires.
3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
4. Seal vapor retarder penetrations by mechanical fasteners with vapor retarder adhesive.
5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

W. Duct and Plenum Liner Application:

1. Adhere insulation with adhesive for 90 percent coverage.

2. Secure insulation with mechanical liner fasteners. Comply with SMACNA Standards for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

3.3 SCHEDULES

A. PIPING SYSTEMS	INSULATION TYPE	PIPE SIZE Inch	THICKNESS Inch
Heating Systems:			
Heating Supply and Return (up to 140 ○F)	A	Up to 1 1/4" 1 1/2" and up	1" 1 1/2"
Heating Supply and Return (up to 200 ○F)	A	Up to 1 1/4" 1 1/2" and up	1 1/2" 2"
Make-up Water	A or B	Up to 1 1/4" 1 1/2" to 6"	1/2" 1"
Cooling Systems:			
Refrigerant Suction and Hot Gas (With U.V. Coating at exterior)	B	Up to 1 1/4" 1 1/2" to 6"	1/2" 1"
Refrigerant Liquid	B	Up to 1 1/4" 1 1/2" and Up	1" 1 1/2"
Condensate Drain within building	A	All	1"
All PVC piping within plenum space	As specified with Plenum Wrap throughout	---	–

3.4 DUCTWORK	THICKNESS Inch	TYPE
Medium Pressure Supply Ducts	1 1/2" (Min. R-3.5)	GFF
Rectangular Low Pressure Supply Ducts	1" (Min. R-3.5)	GFL or EDL
Round Low Pressure Supply Ducts	1 1/2" (Min. R-3.5)	GFF
Rectangular Return Ducts	1"	GFL or EDL
Transfer Ducts	1"	GFL or EDL
General Exhaust Within 10 Ft. of Fan	1"	GFL or EDL
Return/ Relief Ductwork (Rectangular)	1"	GFL or EDL
Mixed Air Ductwork	2"	GFR

Outside Air Intake Ducts & Plenums	2"	GFR
Round Outside Air Intake Ducts	3" (Min. R-8)	GFL
Ductwork Downstream of Fan Powered Box	1"	GFL or EDL
Combustion Air Ducts	2"	GFF
Ductwork in unheated attic	2" (R-6)	GFF
Round Supply and Return Ducts	1 1/2 "	GFF
Exhaust Ductwork Between Damper and Exterior Wall/Roof Penetration	2"	GFR
Exposed supply or Return Ductwork in Mechanical or Storage Rooms	1"	GFR
Exterior Ductwork with exterior jacket	4" (R-12)	GFR
Evaporative Condenser Intake and Exhaust	1"	GFR
Supply Ducts From Fans to Vertical Ducts in Shafts (Cooling System)	1 1/2"	GFF
Supply Ducts in Vertical Shafts (Cooling Systems)	1 1/2"	GFR
Ductwork Exposed Within Conditioned Space	---	---

END OF SECTION 23 07 00

SECTION 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Air supply piping and tubing.
2. Humidistats.
3. Thermostats.
4. Time clocks.
5. Alarm system.
6. Control air dampers.
7. Electric damper actuators.
8. Outside air measuring and modulation device.
9. Control Cabinets.
10. Control Valves.
11. Input/Output sensors.
12. Carbon Dioxide Transmitters.
13. Carbon Monoxide/Nitrogen Dioxide Transmitters.
14. Air flow traverse probes.
15. Occupancy Sensors.

1.3 REFERENCES

A. Air Movement and Control Association International, Inc.:

1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

B. American Society of Mechanical Engineers:

1. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

C. ASTM International:

1. ASTM B32 - Standard Specification for Solder Metal.
2. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
3. ASTM D1693 - Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.

D. National Electrical Manufacturers Association:

1. NEMA DC 3 - Residential Controls - Electrical Wall Mounted Room Thermostats.

E. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

F. Underwriters Laboratories, Inc.:

1. UL 1820 - Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Shop Drawings: Indicate operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Coordinate submittals with information requested in Section 23 09 93.

C. Product Data: Submit description and engineering data for each control system component. Include sizing as requested.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors.

C. Operation and Maintenance Data: Submit inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

1.6 QUALITY ASSURANCE

A. Provide pneumatic tubing located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5 m) when tested in accordance with UL 1820.

B. Control Air Damper Performance: Test in accordance with AMCA 500.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this section with minimum five years documented experience. Company shall either be the manufacturer itself, or designated by the manufacturer to be a factory authorized distributer/installer of their products. Company shall be located within 50 miles of the project site.

1.9 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Accept controls on site in original factory packaging Inspect for damage.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.11 MAINTENANCE SERVICE

A. See Division 01 for project requirements.

B. Furnish service and maintenance of control system for one year from Date of Substantial Completion.

1.12 EXTRA MATERIALS

A. See Division 01 for project requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS (Unless Noted Otherwise)

A. Johnson Controls.

B. Schneider.

C. Siemens.

D. Carrier.

E. Trane.

F. Honeywell.

G. Belimo.

2.2 AIR SUPPLY PIPING AND TUBING

A. Control and Instrumentation Tubing:

1. Copper Tubing: ASTM B280 Type ACR, or ASTM B88 Type K, seamless, hard drawn or annealed.

a. Fittings: ASME B16.22, wrought copper.
b. Joints: Solder, lead free, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F.

2. Copper Tubing: ASTM B280 Type ACR, or ASTM B88 Type K, seamless, hard drawn or annealed.

a. Fittings: UL listed, rod or forged brass rated to 200 psig at 100 degrees F.
b. Joints: Ball sleeve compression type.

3. Polyethylene Tubing: Black, flame retardant, virgin polyethylene, conforming to modified ASTM D1693 test.

a. Fittings: UL labeled, rod or forged brass rated to 200 psig at 100 degrees F.
b. Joints: Compression or barbed type.

2.3 HUMIDISTATS

A. Room Humidistats:

1. Wall mounted, proportioning type.
2. Throttling range: Adjustable, 2 percent, relative humidity.
3. Operating range: 30 to 80 percent.
4. Maximum temperature: 110 degrees F.
5. Cover: Set point indication or Concealed setpoint as directed by owner.

B. Limit Duct Humidistat:

1. Insertion, two-position type.
2. Throttling range: Adjustable 2 percent relative humidity.
3. Operating range: 20 to 80 percent.
4. Maximum temperature: 150 degrees F.

2.4 THERMOSTATS

A. Pneumatic Room Thermostats:

1. Adjustable proportioning type, single or dual setpoint, containing single bimetallic element for heating or cooling only or dual bimetallic elements for heating and cooling or day or night.
2. Set Point Adjustment: Minimum 10 degrees F set point adjustment and adjustable dead band.
3. Covers: Locking with concealed setpoint in public spaces.

B. Electric Room Thermostats:

1. Type: NEMA DC 3, 24 volts, with setback/setup temperature control where specified in the sequence of operations.
2. Service: cooling only, heating only, cooling and heating, and staged as required by sequence of operations.
3. Covers: Locking with concealed setpoint in public spaces.

C. Line Voltage Thermostats:

1. Integral manual On/Off/Auto selector switch, single or two-pole.
2. Dead band: Maximum 2 degrees F.
3. Cover: Locking with concealed setpoint in public spaces.
4. Load capacity rating.

D. Room Thermostat Accessories:

1. Thermostat Covers: Brushed aluminum.
2. Insulating Bases: For thermostats located on exterior walls.
3. Thermostat Guards: Locking transparent plastic mounted on separate base.
4. Adjusting Key: Matching device.
5. Aspirating Boxes: for thermostats requiring flush installation.

E. Outdoor Reset Thermostat:

1. Remote bulb or bimetal rod and tube type, proportioning action with adjustable throttling range, adjustable setpoint.
2. Scale range: -10 to 70 degrees F.

F. Immersion Thermostat: Remote bulb or bimetallic rod and tube type, proportional action with adjustable setpoint and adjustable throttling range.

G. Air-stream Thermostats:

1. Remote bulb or bimetallic rod and tube type, proportional action with adjustable setpoint in middle of range and adjustable throttling range.
2. Averaging service remote bulb element: 7.5 feet.

H. Heating/Cooling Valve Top Thermostats:

1. Proportional acting for proportional flow, molded rubber diaphragm, remote bulb liquid filled element, direct and reverse acting at differential pressure to 25 psig, cast housing with position indicator and adjusting knob.

I. Programmable electric solid state microcomputer based room thermostat:

1. Acceptable Manufacturer:

    a. White-Rogers IF-90 Series.
    b. Johnson Controls.
    c. Invensys.
    d. Same manufacturer as associated rooftop unit.

2. Preferential rate control to minimize overshoot and deviation from setpoint.
3. Set-up for four separate temperatures per day.
4. Instant override of setpoint for continuous or a 2 hour period.
5. Short cycle protection.

6. Programming based on every day of the week.
7. Selection features including degree F display, 12 or 24 hour clock, keyboard disable, fan on-auto, heating - cooling - off.
8. Battery replacement without program loss.
9. Thermostat display:

    a. Time of day.
    b. Actual room temperature.
    c. Programmed temperature.
    d. Programmed time.
    e. Duration of timed override.
    f. Day of week.
    g. System mode indication: heating, cooling, auto, off, fan auto, fan on.

2.5 TIME CLOCKS

A. Digital Time Clocks

1. Solid state programmable time control with required number of separate programs, 24 hour battery carry over duty cycling and individual on/off/auto switches for each program with 7 day programming, 365 day calendar with 20 programmable holidays, and choice of fail safe operation for each program.

B. Mechanical Time Clocks

1. The time switch shall be of the 24-Hour dial type, capable of permitting up to 12 ON/OFF operations each day. The time switch shall provide a minimum ON/OFF time of 1 hour. The time switch shall be powered by 120VAC - 60 Hz power supply. The time switch motor shall be a synchronous motor, which shall be designed to withstand a minimum of 6000 volt transients. The time switch motor shall be connected to the supply terminals with ring-type connectors and shall not require more than 3 Watts to operate the time switch. The time switch mechanism shall be a snap-in design to provide ease of mechanism removal from the enclosure. The time switch enclosure shall be a steel lockable enclosure. The time switch enclosure shall provide a minimum of 31 cubic inches of wiring space and provide a nonremovable cover, which shall swing open a full 180 degrees. The time switch shall provide clear terminal identification on a see-through non-curling terminal insulator. A visual indicator shall be provided in the time switch for inspecting clock motor operation. The time switch contact blades shall be a one piece design with welded silver alloy contacts and shall be designed to provide wiping action on contacts during operation to ensure reliable load switching. Terminal connections shall be made using teeter-type terminal screws to provide secure connections for wire sizes up to #8 AWG. Switch configuration shall be SPST or DPST 1NO/1NC as required. The time switch shall be Agency Listed under Clock Operated Switches.

2.6 ALARM SYSTEM

A. Furnish alarm panel with individual indication, horn, silenced acknowledge switch, and test switch.

B. At alarm condition indication, light flashes and alarm sounds. Horn stops when acknowledge switch is pushed and system indicates alarm conditions by continuous light until trouble condition has cleared. Alarm sounds again when second alarm occurs before first one has cleared.

C. Furnish remote panels with duplicate functions of primary panel. Furnish alarm silence/acknowledge switch to acknowledge alarm from each panel.

D. Furnish dry contacts at main alarm panel for use by independent alarm monitoring company to indicate each alarm condition.

2.7 THERMAL BREAK DAMPERS: Where connected to wall louver or penetration to the exterior. Damper sizing to be custom to the 1/16th of an inch for maximum free area.

A. Acceptable Manufacturer:

1. T.A. Morrison & Co., Inc. Series 9000.
2. Ruskin CD-TI-50.
3. Greenheck ICD.
4. Pottorff.

B. Features:

1. Maximum Leakage Rating: 4.1 cfm/sq. ft. at a 4”w.g. differential pressure as AMCA certified leakage rating (tested between 50 F. -104 F.)
2. Leakage Rating at Design Temperature: Less than or equal to 5.8 cfm/sq. ft. at a 4”w.g. differential pressure at a temperature of -20 degrees F.
3. Design Parameters: Consistent thermal break design theme evident throughout damper construction.

C. Construction:

1. Frame: No hat channels or top and bottom flange in frame

   a. Install in Duct application: 4” depth with (3) 1” thick sides and (1) 2” thick side (for exposed linkage)
   b. Flange to Duct application: 4” depth with (4) 1”thick sides

2. Blades: 6” thickness or under, thermally-broken three times and insulated with a polyurethane ® is greater than or equal to 6.6) injected insulation for condensation resistance and heat transmission resistance.
3. Linkage: To be exposed and out of the air stream to avoid path of air born contaminants. Utilize hexagonal flat-on-flat design (between blade pin and crank arm) to insure against slipping for the life of the damper.
4. Bearings: Maintenance-free for the life of the damper. Dual sleeve in system. Made with materials unaffected by temperature change (-76 F. to 210 F.) nylon/metal bearings not acceptable.
5. Drive Rod Assembly: Extendible single rod to be a minimum of 6" for damper width less than 16" or 12”, extendible to prevent binding and to maintain positive blade rotation and blade structural integrity.
6. Blade-Edge Seals: Silicone to maintain flexibility and durability at design temperature of -20 degrees F.
7. Jamb Seals: Silicone to maintain flexibility and durability at design temperature of -20 degrees F. and to maintain thermal break design.

2.8 INTERIOR DAMPERS: All dampers not indicated to be thermal break type. Sizing to be available custom to the 1/16th of an inch for maximum free area.

A. Acceptable Manufacturer:

1. T.A. Morrison & Co., Inc. Series 1000.
2. Ruskin CD-50.
3. Greenheck.
4. Pottorff.

B. Performance: Test in accordance with AMCA 500.

C. Frames: Galvanized steel, welded or riveted with corner reinforcement.

D. Blades: Galvanized steel, maximum blade size 6 inches wide, 48 inches long, attached to minimum 1/2 inch shafts with set screws.

E. Blade Seals: Synthetic elastomeric or Neoprene mechanically attached, field replaceable.

F. Jamb Seals: Spring stainless steel.

G. Shaft Bearings: Graphite impregnated nylon sleeve, with thrust washers at bearings or lubricant free, stainless steel, single row, ground, flanged, radial, antifriction type with extended inner race.

H. Linkage Bearings: Graphite impregnated nylon.

I. Leakage: Less than 2 percent based on approach velocity of 2000 ft/min and 4 inches w.g.

J. Maximum Pressure Differential: 6 inches w.g.

K. Temperature Limits: -40 to 200 degrees F.

2.9 ELECTRIC DAMPER ACTUATORS

A. Operation: Two-position or reversing type proportional motor as required by specified sequence, spring-return to fail position where specified in sequence.

B. Enclosure Rating: NEMA 250 Type 2 Enclosure.

C. Mounting: Direct mount.

D. Stroke: 90 seconds end to end full stroke, 15 seconds return to normal for spring return.

E. Protection: Electronic stall protection.

F. Control Input: 0-10 VDC or 0-20 mADC.

G. Power: Nominal 24 or 120 volt AC.

H. Torque: Size for minimum 150 percent of required duty.

I. Duty cycle: rated for 65,000 cycles.

J. Accessories:

1. Cover mounted transformer.
2. Auxiliary potentiometer.
3. Damper linkage.
4. Direct drive feedback potentiometer.

5. Output position feedback.
6. Field selectable rotational, spring return direction, field adjustable zero and span.
7. End switch.

2.10 CONTROL CABINETS

A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gages, pilot lights, push buttons and switches flush on cabinet panel face.

B. NEMA 250, general purpose utility enclosures with enameled finished face panel.

C. Provide common keying for all panels.

2.11 CONTROL VALVES

A. Globe Pattern:

1. Up to 2 inches: Bronze body, bronze trim, rising stem, renewable composition disc, screwed ends with backseating capacity repackable under pressure.
2. Over 2 inches: Iron body, bronze trim, rising stem, plug-type disc, flanged ends, renewable seat and disc.
3. Hydronic Systems:

a. Rate for service pressure of 125 psig at 250 degrees F.
b. Replaceable plugs and seats of stainless steel or brass.
c. Size for 3 psig maximum pressure drop at design flow rate.
d. Two way valves shall have equal percentage characteristics, three way valves linear characteristics. Size two way valve operators to close valves against pump shut off head.

4. Steam Systems:

a. Rate for service pressure of 125 psig at 250 degrees F.
b. Replaceable plugs and seats of stainless steel. Pressure drop across any steam valve shall be at maximum flow as shown on the Drawings.
c. Size for 10 psig inlet pressure and 5 psig pressure drop.
d. Valves shall have modified linear characteristics.

B. Pneumatic Operators:

1. Rolling diaphragm, spring loaded, piston type with spring range as required.
2. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
3. Select operator for full shut off at maximum pump differential pressure.

C. Electronic Operators:

1. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
2. Select operator for full shut off at maximum pump differential pressure.

D. Radiation Valves:

1. Bronze body, bronze trim, 2 or 3 port as indicated, replaceable plugs and seats, union and threaded ends.
2. Rate for service pressure of 125 psig at 250 °F.
3. Size for 3 psig maximum pressure drop at design flow rate.
4. Two way valves shall have equal percentage characteristics, three way valves linear characteristics. Size two way valve operators to close valves against pump shut off head.
5. Operators (Modulating): Self contained, linear motorized actuator.

E. Self Contained Thermostatic Radiator Valves:

1. Acceptable Manufacturer:

   a. Danfoss RA2000 Model 013G8564

2. The operator shall consist of a separate remote mounted dial and sensor.

3. The thermostatic radiator valve shall be selected to maintain room temperature within +/- 1 Deg. F. The operator shall be of the bellows design with either a liquid or vapor charge. The operator shall be capable of temperature adjustment between 45 Deg. and 86 Deg. F.
4. Locking or limiting of the temperature shall be accomplished by the use of limiting pins or rings. The valve shall be of nickel plated brass construction with a fully replaceable packing gland. The gland shall be replaceable while the system is in full operation due to a valve back seat gasket. The packing gland shall be capable of replacement simply by using only a crescent wrench. The valve disc shall be constructed of EPDM, capable of withstanding 250 °F temperatures.
5. The operator shall connect to the valve using a snap-on fast mounting system and secured by an Allen screw.
6. Sensor shall be rated to 140 °F. air temperature.
7. Valve body shall be rated to 20 psig differential and 145 psig static pressures.

2.12 INPUT/OUTPUT SENSORS

A. Electronic Sensors: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

1. Thermistor or Resistance Temperature Detectors temperature sensors as follows:

   a. Accuracy: Plus or minus .3° F at calibration point.
   b. Wire: Twisted, shielded pair cable.
   c. Insertion Elements in Ducts: Single point, 8 inches long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft.
   d. Averaging Elements in Ducts: 17 foot long; use where prone to temperature stratification or where ducts are larger than 9 sq. ft. length as required.
   e. insertion Elements for heating system: Brass well with minimum insertion length of 2-1/2 inches. Stainless steel wells are required for all chiller systems.
   f. Room Sensors: Cover to be blank, with plus/minus 3 degree setpoint adjustable, and/or with override button at Owners choice.
   g. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.

h. Room Security Sensors: Stainless steel cover plate with insulated back and security screws.

B. Wireless Temperature Sensors (only where specifically noted on drawings):

1. Wireless sensors shall be blank cover without temperature adjustment, display, or override button.
2. Sensors shall measure the room temperature and transmit the data through 418MHz RF to a receiver. The transmitter shall be mounted in an enclosure and have an in-building range of 100 feet which is extendable to 1,000 Feet with a repeater.
3. The unit shall have an estimated battery life of 8 years using two high-capacity 3.6V lithium batteries (full AA size) with a transmit rate of about once every 10 seconds.
4. Each transmitter shall have a unique address with built in error detection. Each variable sent by the transmitter shall be picked up by the receiver and converted by an Analog Output Module to a voltage, current or resistance signal which shall be sent to the controller.
5. The unit shall be able to be set up to trigger an alarm on the controller when the batteries need replacing.
6. Sensor specifications shall be as follows:

a. Inputs: Built in thermistor
b. Accuracy: ±0.36°F (±0.2°C)
c. Transmitted Range: -40°F to 185°F (-40°C to 85°C)
d. Environmental Operation Range:

1) Temp: 32°F to 140°F (0°C to 60°C)
2) Humidity: 5% to 95% RH non-condensing

e. Material: ABS Plastic
f. Material Rating: UL94 V-0
g. Radio Frequency: 418 MHZ
h. Transmitter Interval: ~10 seconds
i. Antenna: Built inside the enclosure

C. Humidity Sensors: Bulk polymer sensor element.

1. Accuracy: 5 percent full range with linear output.
2. Room Sensors: With locking cover matching room thermostats, span of 20 to 80% relative humidity.
3. Duct and Outside=Air Sensors: With element guard and mounting plate, range of 0 to 100% relative humidity.

D. Static-Pressure Transmitter: Nondirectional sensor with suitable range for expected input, and temperature compensated.

1. Accuracy: 2 percent of full scale with repeatability of 0.5 percent.
2. Output: 4 to 20 mA.
3. Building Static-Pressure Range: 0 to 0.25 inch w.g.
4. Duct Static-Pressure Range: 0 to 5 inches w.g.

E. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system; proportional output 4 to 20 mA.

F. Equipment operation sensors as follows:

1. Status inputs for Fans and Pumps: Current-sensing relay with current transformers, adjustable and set to 175 percent of rated motor current.

G. Electronic Valve/Damper Position Indication: Visual scale indicating percent of travel.

H. Digital to Pneumatic Transducers:

1. Convert plus or minus 12 vdc pulse width modulation outputs or continuous proportional current or voltage to 0 to 20 psi.

I. Damper Position Indication: Potentiometer mounted in enclosure with adjustable crank arm assembly connected to damper to transmit 0-100 percent damper travel.

2.13 CARBON DIOXIDE TRANSMITTERS:

A. Acceptable Manufacturers:

1. Veris CWL.
2. Johnson Controls CD-W.
3. Vulcain 90DM3A.
4. ACME Engineering Products.

B. Wall mounted (36-60" AFF) sensor with +/- 75 PPM, +/- 2% accuracy.

C. Field selectable measurement range (0-2000 or 0-5000 PPM)

D. Self calibrating algorithm utilizing lowest reading every 24 hours to recalibrate sensor and reduce drift.

E. Sensor must be able to be field calibrated.

F. Alarm relay with setpoint for direct ventilator control.

G. 5 year warranty.

2.14 CARBON MONOXIDE/NITROGEN DIOXIDE TRANSMITTERS:

A. Acceptable Manufacturers:

1. Vulcain VA-301+Remote NO2.
2. MSA Z Guard.
3. ACME Engineering Products.

B. Monitor shall be powered by the control panel's power output rated at 17-27 Vac or by an external power supply rated at 17-27 Vac or 24-38 Vdc. Capable of remote sensing, at distances of up to 200 feet, the gas transmitter shall incorporate either an electrochemical cell (for toxic gas monitoring). Solid state / CMOS will not be accepted. Unit sensing cell must compensate for variations in relative humidity and temperature to maintain high levels of accuracy.

C. Monitor shall provide a total for four alarm relays. Two relays shall correlate to Carbon Monoxide. Two relays shall correlate to Nitrogen Dioxide. The relays shall provide for a low level gas concentration to signal equipment start (such as exhaust fans or make up air units). In addition, the second relay shall provide for a high concentration of gas. Monitor shall also provide a built in annunicator that shall alarm at high concentration level. Audible alarm and visual alarms shall auto self reset when gas concentrations fall below specified thresholds for one minute.

D. Stand alone monitors may be wired in seires for power and parallel for alarm relay notification.

E. An LED display, with the possibility of adding optional an LCD, shall provide reading of concentration of gas. Normal operation shall be indicated by a green LED; fault operation shall be indicted by a yellow LED.

F. Monitor shall be capable of operating within relative humidity ranges of 5-90% and temperature ranges of 30º F to 100º F (0º C to 40º C). Transmitter must also have optional capacity of operating at lower temperature range.

G. Unit shall be manufactured to UL 1244 label and CSA 22.2. Transmitter must be manufactured within an ISO 9002 production environment.

2.15 AIR FLOW TRAVERSE PROBES

A. Acceptable Manufacturers:

1. Tek-Air, Model T-FP7000 Series.
2. Air Monitor.
3. Paragon.

B. Differential pressure type air flow traverse probes to be aluminum with hard anodized or irradite finish.

C. Probe shall include minimum 1" threaded rod on far end and include jam nuts. Fan inlet probes shall be provided with swivel type mounting brackets for mounting in the fan inlet bells. Where fans are of the dual inlet type, two sets of inlet probes must be provided. Fan inlet probes shall be provided with the fittings to allow for the connection of control tubing to the probe assemblies.

D. Probes shall be capable of operating with an accuracy of 3% of actual volume over the fan operating range when used with the appropriate conversion formula.

2.16 OCCUPANCY SENSORS:

A. Acceptable Manufacturers:

1. Sensorswitch: WV PDT 16R
2. Approved Equal.

B. Sensors shall have isolated relay for HVAC controls.

C. Power Pack: Sensorswitch PP-20 or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify building systems to be controlled are ready to operate.

C. Verify pneumatic tubing is clear of water, oil or other contaminants and compressed air supply has filter and dryer operating before installing control devices or operators.

D. Verify air handling units and ductwork have been accepted and air filters are in place before installing sensors in air streams.

E. Verify location of thermostats, humidistats, carbon dioxide sensors, etc. and other exposed control sensors with Drawings before installation.

3.2 INSTALLATION

A. Install copper tubing in mechanical rooms at the following locations:

1. Where subject to damage or temperatures in excess of 200 degrees F.
2. Where adjacent to heating pipes passing through common sleeve.
3. Where not readily accessible.

B. In mechanical rooms, at installer's option, install bundled plastic tubing with junction boxes or single plastic tubing with tray or raceway.

C. Solder copper tubing joints except at instruments or equipment. Install compression fittings at instruments or equipment.

D. Install tubing concealed from view in finished spaces.

E. Install tubing exposed only in mechanical rooms, storage rooms, and other unfinished spaces.

F. Install tubing mechanically attached to supporting surfaces.

G. Install sleeves through concrete surfaces in minimum one inch sleeves, extended 6 inches above floors and one inch below bottom surface of slabs.

H. Purge tubing with dry, oil-free compressed air before connecting control instruments.

I. Install thermostats, humidistats, space temperature sensors, carbon dioxide sensors and other exposed control sensors after locations are coordinated with other Work.

J. Install thermostats, humidistats, space temperature sensors, carbon dioxide sensors and other exposed control sensors 60 inches above floor. Align with light switches.

K. Install freeze protection thermostats using flanges and element holders.

L. Install outdoor reset thermostats and outdoor sensors indoors on northern shades exposure, with sensing elements outdoors.

M. Provide separable sockets for liquids and flanges for air bulb elements.

N. Install lockable clear guards on thermostats located in public areas, entrances, etc. and as indicated on Drawings.

O. Provide valves with position indicators and with pilot positioners where sequenced with other controls.

P. Provide mixing dampers of opposed blade construction arranged to mix streams. Provide pilot positioners on mixed air damper motors.

Q. Provide isolation (two position) dampers of parallel blade construction.

R. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.

S. Install control panels adjacent to associated equipment on vibration free walls or freestanding supports. Install engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.

T. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.

U. Install conduit and electrical wiring in accordance with Section 26 05 03.

V. Low voltage wiring shall be U/L listed and plenum rated (low smoke producing). Wiring shall be concealed in walls and may be installed without conduit above accessible lay-in ceiling spaces only. All wiring passing through fire barriers shall have fire caulked conduit sleeve through wall.

3.3 FIELD QUALITY CONTROL

A. Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. After completion of installation, test and adjust control equipment. Submit data showing set points and final adjustments of controls.

C. Test pneumatic systems to system pressure maximum of 30 psig. Check calibration of instruments. Recalibrate instruments out of calibration. Replace defective instruments.

3.4 DEMONSTRATION AND TRAINING

A. Division 01: Requirements for demonstration and training.

B. Demonstrate complete operation of systems, including sequence of operation prior to Date of Substantial Completion.

C. Demonstrate complete and operating system to Owner.

END OF SECTION 23 09 00

SECTION 23 09 23 - DIRECT DIGITAL CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Control equipment.
2. Software.

1.3 REFERENCES

A. ASME MC85.1 - Terminology for Automatic Control.

B. NEMA EMC1 - Energy Management Systems Definitions.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

D. NFPA 70 - National Electrical Code.

E. NFPA 90A - Installation of Air Conditioning and Ventilation Systems.

1.4 DEFINITIONS

A. Analog: A continuously variable system or value not having discrete levels. Typically exists within a defined range of limiting values.

B. Binary: A two-state system where an "ON" condition is represented by one discrete signal level and an "OFF" condition is represented by a second discrete signal level.

C. Building Automation System (BAS): The total integrated system of fully operational and functional elements, including equipment, software, programming, and associated materials, to be provided by this Division BAS Contractor and to be interfaced to the associated work of other related trades.

D. BAS Contractor: The Contractor to provide the work of this Division. This Contractor shall be the primary installer, commissioner and ongoing service provider for the BAS work.

E. Control Sequence: A BAS pre-programmed arrangement of software algorithms, logical computation, target values and limits as required to attain the defined operational control objectives.

F. Direct Digital Control: The digital algorithms and pre-defined arrangements included in the BAS software to provide direct closed-loop control for the designated equipment and controlled variables. Inclusive of Proportional, Derivative and Integral control algorithms together with target values, limits, logical functions, arithmetic functions, constant values, timing considerations and the like.

G. BAS Network: The total digital on-line real-time interconnected configuration of BAS digital processing units, workstations, panels, sub-panels, controllers, devices and associated elements individually known as network nodes. May exist as one or more fully interfaced and integrated sub-networks, LAN, WAN or the like.

H. Node: A digitally programmable entity existing on the BAS network.

I. BAS Integration: The complete functional and operational interconnection and interfacing of all BAS work elements and nodes in compliance with all applicable codes, standards and ordinances so as to provide a single coherent BAS as required by this Division.

J. Provide: The term "Provide" and its derivatives when used in this Division shall mean to furnish, install in place, connect, calibrate, test, commission, warrant, document and supply the associated required services ready for operation.

K. PC: Compatible Personal Computer from a recognized major manufacturer

L. Furnish: The term "Furnish" and its derivatives when used in this Division shall mean supply at the BAS Contractor's cost to the designated third party trade contractor for installation. BAS Contractor shall connect furnished items to the BAS, calibrate, test, commission, warrant and document.

M. Wiring: The term "Wiring" and its derivatives when used in this Division shall mean provide the BAS wiring and terminations.

N. Install: The term "Install" and its derivatives when used in this Division shall mean receive at the jobsite and mount.

O. Protocol: The term "protocol" and its derivatives when used in this Division shall mean a defined set of rules and standards governing the on-line exchange of data between BAS network nodes.

P. Software: The term "software" and its derivatives when used in this Division shall mean all of programmed digital processor software, preprogrammed firmware and project specific digital process programming and database entries and definitions as generally understood in the BAS industry for real-time, on-line, integrated BAS configurations.

Q. The use of words in the singular in these Division documents shall not be considered as limiting when other indications in these documents denote that more than one such item is being referenced.

R. Headings, paragraph numbers, titles, shading, bolding, underscores, clouds and other symbolic interpretation aids included in the Division documents are for general information only and are to assist in the reading and interpretation of these Documents.

S. The following abbreviations and acronyms may be used in describing the work of this Division:

ADC	-	Analog to Digital Converter
AI	-	Analog Input
AN	-	Application Node
ANSI	-	American National Standards Institute
AO	-	Analog Output
ASCII	-	American Standard Code for Information Interchange
ASHRAE		American Society of Heating, Refrigeration and Air Conditioning Engineers
AWG	-	American Wire Gauge
CPU	-	Central Processing Unit
CRT	-	Cathode Ray Tube
CZC	-	Commercial Zone Control
DAC	-	Digital to Analog Converter
DC	-	Digital Controller
DDC	-	Direct Digital Control
DI	-	Digital Input
DO	-	Digital Output
EEPROM		Electronically Erasable Programmable Read Only Memory
EMI	-	Electromagnetic Interference
FAS	-	Fire Alarm Detection and Annunciation System
GUI	-	Graphical User Interface
HOA	-	Hand-Off-Auto
ID	-	Identification
IEEE	-	Institute of Electrical and Electronics Engineers
I/O	-	Input / Output
LAN	-	Local Area Network
LCD	-	Liquid Crystal Display
LED	-	Light Emitting Diode
MCC	-	Motor Control Center
NC	-	Normally Closed
NIC	-	Not In Contract
NO	-	Normally Open
OWS	-	Operator Workstation
OAT	-	Outdoor Air Temperature
PC	-	Personal Computer
RAM	-	Random Access Memory
RF	-	Radio Frequency
RFI		Radio Frequency Interference
RH	-	Relative Humidity
ROM	-	Read Only Memory
RTD	-	Resistance Temperature Device
SPDT	-	Single Pole Double Throw
SPST	-	Single Pole Single Throw
TBA	-	To Be Advised
TCP/IP	-	Transmission Control Protocol/Internet Protocol
TTD	-	Thermistor Temperature Device
UPS	-	Uninterruptible Power Supply
VAC	-	Volts, Alternating Current
VAV	-	Variable Air Volume
VDC	-	Volts, Direct Current
WAN	-	Wide Area Network
XVGA	-	Extended Video Graphics Adapter

1.5 BAS SYSTEM DESCRIPTION

A. Provide extension of existing Trane Tracer DDC temperature control system consisting of hardware and software as required to fully support all new or revised systems and equipment. Remove all portions of existing control system that are no longer needed including conduit, wiring, pneumatic tubing, devices, sensors, etc.

B. Building Automation System shall be web based so any computer with a browser and access to the internet can access the Building Automation System, view graphics, receive alarms, etc. for all schools. All control points listed in Section 230993 - "Sequence of Operation" shall be performed by the DDC system and displayed on the existing Operator Workstation. Any other control work required to complete the sequence of operation specified in Section 230993 may be electric or electronic. Contractor shall provide all transformers, relays etc. necessary for a complete operating system.

C. Furnish all labor, materials, equipment, and service necessary for a complete and operating temperature control system, utilizing a high speed peer to peer network of interoperable Direct Digital Controls (DDC), local Graphical User Interface (GUI). The Local Area Network (LAN) shall be either a 10 or 100 Mpbs Ethernet network supporting BACnet, Java, XML, HTTP, and CORBA IIOP for maximum flexibility for integration of building data with enterprise information systems and providing support for multiple Universal Network Controllers (UNCs), user workstations and a local host computer system.

D. The Enterprise Ethernet (IEEE 802.3) LAN shall utilize Carrier Sense Multiple/Access/Collision Detect (CSMA/CD), Address Resolution Protocol (ARP) and User Datagram Protocol (UDP) operating at 10 or 100 Mbps.

E. The system will consist of an open architecture that utilizes EIA standard 709.1, the LonTalk™ protocol, as the common communication protocol between all controllers and integral ANSI / ASHRAE™ Standard 135-2004, BACnet functionality to assure interoperability between all system components. Both the LonTalk™ protocol and the ANSI / ASHRAE™ Standard 135-2004, BACnet protocol are required to assure that the project is fully supported by the leading HVAC open protocol to reduce future building maintenance, upgrade, and expansion costs.

F. The system will consist of an architecture (BACnet Applications) that utilizes a MS/TP selectable 9.6-76.8 K9600 Baud protocol, as the common communication protocol between all controllers and integral ANSI / ASHRAE™ Standard 135-2004, BACnet functionality to assure interoperability between all system components. Large capacity DDC controllers (AACs) shall be capable of communicating as a MS/TP device or as a BACnet IP device communicating at 10/100 Mbps on a TCP/IP trunk. The AAC shall have a MS/TP bus that is capable of supporting up to 127 UECs or VAVDDCs without the addition of repeaters. The ANSI / ASHRAE™ Standard 135-2004, BACnet protocol is required to assure that the project is fully supported by the leading HVAC open protocol to reduce future building maintenance, upgrade, and expansion costs.

G. The system will consist of an open architecture (LonWorks Applications) that utilizes EIA standard 709.1, the LonTalk™ protocol.

H. Where necessary or desired, LonTalk™ packets may be encapsulated into TCP/IP messages to take advantage of existing infrastructure or to increase network bandwidth.

1. Any such encapsulation of the LonTalk™ protocol into IP datagrams shall conform to existing LonMark™ guide-lines for such encapsulation and shall be based on industry standard protocols.
2. The products used in constructing the BAS shall be LonMark™ compliant.
3. In those instances in which Lon-Mark™ devices are not available, the BAS contractor shall provide LonWorks™ devices with application source code, device resource files, and external interface definitions.

I. The software tools required to network manage both the LonTalk™ protocol and the ANSI / ASHRAE™ Standard 135-2004, BACnet protocol must be provided with the system. Drawings are diagrammatic only. Equipment and labor not specifically referred to herein or on the plans that are required to meet the functional intent, shall be provided without additional cost to the Owner. Minimum BACnet compliance is Level 3; with the ability to support data read and write functionality. Physical connection of BACnet devices shall be via Ethernet/Ethernet IP or MS/TP.

J. Complete temperature control system to be DDC with electronic sensors and electronic/electric actuation of Mechanical Equipment Room (MER) valves and dampers and electronic actuation of terminal equipment valves and actuators as specified herein. The BAS is intended to seamlessly connect devices throughout the building regardless of subsystem type, i.e. variable frequency drives, low voltage lighting systems, electrical circuit breakers, power metering and card access should easily coexist on the same network channel.

1. The supplied system must incorporate the ability to access all data using Java enabled browsers without requiring proprietary operator interface and configuration programs.
2. An Open DataBase Connectivity (ODBC) or Structured Query Language (SQL) compliant server database is required for all system database parameter storage.

    a. This data shall reside on a supplier-installed server for all database access.
    b. Systems requiring proprietary database and user interface programs shall not be acceptable.
    c. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer's internal Intranet network.
    d. Systems employing a "flat" single tiered architecture shall not be acceptable.

K. All work described in this section shall be installed, wired, circuit tested and calibrated by factory certified technicians qualified for this work.

1.6 SUBMITTALS FOR REVIEW

A. See Division 01 for project requirements.

B. Product Data: Provide data for each system component and software module.

C. Shop Drawings:

1. List connected data points, including connected control unit and input device.
2. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration diskette containing graphics.

3. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
4. Indicate description and sequence of operation of operating, user, and application software.
5. Ensure terminology used in submittals conforms to ASME MC85.1.

1.7 SUBMITTALS FOR INFORMATION

A. See Division 01 for project requirements.

B. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.

1. Each control device labeled with setting or adjustable range of control.

C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
2. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
3. Details of control panel faces, including controls, instruments, and labeling.
4. Written description of sequence of operation.
5. Schedule of dampers including size, leakage, and flow characteristics.
6. Schedule of valves including close-off and flow characteristics.
7. Trunk cable schematic showing programmable control unit locations and trunk data conductors.
8. Listing of connected data points, including connected control unit and input device.
9. System graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations.
10. System configuration showing peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.

D. External Interface Files: XIF files or object diagrams for each DDC system component (Custom Application Controller and Application Specific Controller) proposed.

E. PIC/BIBB statement clarifying which BACnet objects and services are supported by each controller.

F. ANSI / ASHRAE™ Standard 135-2004, BACnet PIC/BIBB Statement: Proof of Compliance Level 3 or higher is required to protect building owner by reducing future maintenance and expansion costs.

G. Samples: For each color required, of each type of thermostat cover.

H. Software and Firmware Operational Documentation: Include the following:

1. Engineering, Installation, Operation and Maintenance manuals.
2. Program Software Backup: On a magnetic media or compact disc, complete with data files.

3. Device address list.
4. Printout of software application and graphic screens.
5. Licenses, guarantee, and warranty documents for all equipment and systems.

I. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

J. Maintenance Data: For systems to include in maintenance manuals specified in Division Include the following:

1. Maintenance instructions and lists of spare parts for each type of control device and compressed air station.
2. Interconnection wiring diagrams with identified and numbered system components and devices.
3. Keyboard illustrations and step-by-step procedures indexed for each operator function.
4. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
5. Calibration records and list of set points.

K. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

L. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

1.8 SUBMITTALS AT PROJECT CLOSEOUT

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.

1. Revise shop drawings to reflect actual installation and operating sequences.
2. Include data specified in "Submittals" in final "Record Documents" form.

C. Operation and Maintenance Data:

1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

D. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owners name and registered with manufacturer.

1.9 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.10 MAINTENANCE SERVICE

A. See Division 01 for project requirements.

B. All components, system software, and parts furnished and installed by the BAS contractor shall be guaranteed against defects in materials and workmanship for 1 year of substantial completion. Labor to repair, reprogram, or replace these components shall be furnished by the BAS contractor at no charge during normal working hours during the warranty period. Materials furnished but not installed by the BAS contractor shall be covered to the extent of the product only. Installation labor shall be the responsibility of the trade contractor performing the installation. All corrective software modifications made during warranty periods shall be updated on all user documentation and on user and manufacturer archived software disks. The Contractor shall respond to the owner's request for warranty service within 24 standard working hours.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS/INSTALLERS

A. Trane Chicago
Trane Chicago Sales Office
7100 S. Madison
Willowbrook, Illinois 60527
331-299-6506

B. No substitutions

2.2 CONTROL UNITS GENERAL

A. Provide an adequate number of control units to achieve monitoring and control of all data points specified and necessary to satisfy the sequence of operation for all mechanical systems shown on the plans. Provide a minimum of one separate controller for each HVAC system. Multiple DDC controllers may control one system provided that all points associated with individual control loops are assigned to the same DDC controller. Points used for control loop reset such as outside air or space temperature are exempt from this requirement.

B. All device bus controllers shall be stand alone. In the event of a loss of field bus communications, all field bus controllers shall maintain core control functionality. It is understood that global control functions would be suspended until communications are restored. Applications using field bus peer-to-peer communications will need to be engineered such that basic control can be maintained during a loss of field bus communication. Devices requiring a network level device to perform core/basic control functions are not acceptable.

C. All device bus controllers shall be fully programmable, including application specific devices for fan powered boxes, and other scheduled equipment. Any spare I/O shall be available for owner designated applications and be subject to the functional requirements of the preceding paragraph. Configurable devices or satellite I/O controlled by another device are not acceptable.

D. All field controllers, including central equipment and terminal unit controllers shall have fully programmable logic and sequences of operation, utilizing a Microsoft Visio based graphical programming interface tool.

E. All field controllers, including the BACnet and LonWorks based controllers, must be programmable from a single Microsoft Visio based programming tool.

F. The network images/network variable for both BACnet and LonWorks based controllers must be fully programmable from a single Microsoft Visio based programming tool.

G. Each of the following panel types shall meet the following requirements.

1. Controllers shall be suitable for the anticipated ambient conditions.
2. Controllers used outdoors and/or in wet ambient conditions shall be mounted within waterproof enclosures, and shall be rated for operation at -40°F to 140°F and 5 to 95% RH, non condensing.
3. Controllers used in conditioned ambient space shall be mounted in dustproof enclosures, and shall be rated for operation at 32°F to 122°F and 5 to 95% RH, non condensing.
4. Serviceability: Provide diagnostic LEDs for power, communication, and processor. All wiring connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
5. Memory: The Control Units shall maintain all BIOS and programming information in the event of a power loss for at least 72 hours.
6. Diagnostics: The Building Controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall assume a predetermined failure mode and generate an alarm notification.
7. Immunity to power and noise: Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shutdown below 80% nominal voltage. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 3 ft.
8. Automatic staggered restart of field equipment after restoration of power and short cycle protection.

2.3 UNIVERSAL NETWORK CONTROLLERS (UNC)

A. The Universal Network Controllers (UNC) shall provide the interface between the LAN or WAN and the field control devices, and provide global supervisory control functions over the control devices connected to the UNC. It shall be capable of executing application control programs to provide:

1. Calendar functions
2. Scheduling
3. Trending
4. Alarm monitoring and routing
5. Time synchronization by means of an Atomic Clock Internet site including automatic synchronization
6. Integration of LonWorks controller data and BACnet controller data
7. Network Management functions for all LonWorks based devices

B. The Universal Network Controller Type 2 must provide the following hardware features as a minimum:

1. One Ethernet Port - 10/100 Mbps
2. Two RS-232 ports
3. Four RS-RS485 ports electrically isolated
4. One LonWorks Interface Port - 78KB FTT-10A with Weidmuller connector
5. Power supply 24 VAC or 24 VDC
6. Battery Backup
7. Real-time clock
8. Processor @ 200 MHz or greater
9. 64 Mb flash memory for long term data backup (If battery backup or flash memory is not supplied, the controller must contain a hard disk with at least 1 gigabyte storage capacity)
10. 128 Mb Ram or greater

C. The UNC shall provide multiple user access to the system and support for ODBC or SQL. A database resident on the UNC shall be an ODBC compliant database or must provide an ODBC data access mechanism to read and write data stored within it.

D. The UNC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 64 simultaneous users.

E. Event Alarm Notification and Actions

1. The UNC shall provide alarm recognition, storage; routing, management, and analysis to supplement distributed capabilities of equipment or application specific controllers.
2. The UNC shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up telephone connection, or wide-area network.
3. Alarm generation shall be selectable for annunciation type and acknowledgment requirements including but limited to:

    a. To alarm
    b. Return to normal
    c. To fault

4. Provide for the creation of a minimum of eight of alarm classes for the purpose of routing types and or classes of alarms, i.e.: security, HVAC, Fire, etc.
5. Provide timed (schedule) routing of alarms by class, object, group, or node.
6. Provide alarm generation from binary object "runtime" and /or event counts for equipment maintenance. The user shall be able to reset runtime or event count values with appropriate password control.
7. Control equipment and network failures shall be treated as alarms and annunciated.

8. Alarms shall be annunciated in any of the following manners as defined by the user:

    a. Screen message text
    b. Email of the complete alarm message to multiple recipients. Provide the ability to route and email alarms based on:

        1) Day of week
        2) Time of day
        3) Recipient

    c. Pagers via paging services that initiate a page on receipt of email message
    d. Graphic with flashing alarm object(s)
    e. Printed message, routed directly to a dedicated alarm printer

9. The following shall be recorded by the UNC for each alarm (at a minimum):

    a. Time and date
    b. Location (building, floor, zone, office number, etc.)
    c. Equipment (air handler #, accessway, etc.)
    d. Acknowledge time, date, and user who issued acknowledgement.
    e. Number of occurrences since last acknowledgement.

10. Alarm actions may be initiated by user defined programmable objects created for that purpose.
11. Defined users shall be given proper access to acknowledge any alarm, or specific types or classes of alarms defined by the user.
12. A log of all alarms shall be maintained by the UNC and/or a server (if configured in the system) and shall be available for review by the user.
13. Provide a "query" feature to allow review of specific alarms by user defined parameters.
14. A separate log for system alerts (controller failures, network failures, etc.) shall be provided and available for review by the user.
15. An Error Log to record invalid property changes or commands shall be provided and available for review by the user.

F. Data Collection and Storage

1. The UNC shall have the ability to collect data for any property of any object and store this data for future use.
2. The data collection shall be performed by log objects, resident in the UNC that shall have, at a minimum, the following configurable properties:

    a. Designating the log as interval or deviation.
    b. For interval logs, the object shall be configured for time of day, day of week and the sample collection interval.
    c. For deviation logs, the object shall be configured for the deviation of a variable to a fixed value. This value, when reached, will initiate logging of the object.
    d. For all logs, provide the ability to set the maximum number of data stores for the log and to set whether the log will stop collecting when full, or rollover the data on a first-in, first-out basis.
    e. Each log shall have the ability to have its data cleared on a time-based event or by a user-defined event or action.

3. All log data shall be stored in a relational database in the UNC
4. All log data, when accessed from a server, shall be capable of being manipulated using standard SQL statements.
5. All log data shall be available to the user in the following data formats:

    a. HTML
    b. XML
    c. Plain Text
    d. Comma or tab separated values

6. Systems that do not provide log data in HTML and XML formats at a minimum shall provide as an alternative Microsoft SQL Serverâ, Oracle 8i or Expressâ, Hyperion Solutions™ SQL Server.
7. The UNC shall have the ability to archive its log data either locally (to itself), or remotely to a server or other UNC on the network. Provide the ability to configure the following archiving properties, at a minimum:

    a. Archive on time of day
    b. Archive on user-defined number of data stores in the log (buffer size)
    c. Archive when log has reached it's user-defined capacity of data stores
    d. Provide ability to clear logs once archived

G. Audit Log

1. Provide and maintain an Audit Log that tracks all activities performed on the UNC. Provide the ability to specify a buffer size for the log and the ability to archive log based on time or when the log has reached its user-defined buffer size. Provide the ability to archive the log locally (to the UNC), to another UNC on the network, or to a server. For each log entry, provide the following data:

    a. Time and date
    b. User ID
    c. Change or activity: i.e., Change setpoint, add or delete objects, commands, etc.

2. Database Backup and Storage

    a. The UNC shall have the ability to automatically backup its database. The database shall be backed up based on a user-defined time interval.
    b. Copies of the current database and, at the most recently saved database shall be stored in the UNC. The age of the most recently saved database is dependent on the user-defined database save interval.
    c. The UNC database shall be stored, at a minimum, in XML format to allow for user viewing and editing, if desired. Other formats are acceptable as well, as long as XML format is supported.

2.4 ADVANCED APPLICATION CONTROLLER (AAC) (BACNET APPLICATIONS)

A. For the existing facility, provide and install New equipment DDC controllers and large point count controllers. New controllers shall support open system hardware and software including BACnet protocols and standards.

B. AACs consist of processor board with programmable, nonvolatile, RAM/EEPROM memory for custom control applications. AACs shall be provided for large AHUs, Boiler Plant, Chiller Plant and other applications as shown on drawings.

C. Units monitor or control each input/output point; process information; and at least 50 expressions for customized HVAC control including mathematical equations, Boolean logic, PID control loops with anti-windup, sequencers, timers, interlocks, thermostats, enthalpy calculation, counters, interlocks, ramps, drivers, schedules, calendars, OSS, compare, limit, curve fit, and alarms.

D. The Advanced Application Controller shall have the following point count as a minimum.

1. 4 Digital Inputs.

    a. 10 pulses per second.

2. 12 Universal Inputs

    a. 0-20mA
    b. 0-5 VDC
    c. Balco Sensors
    d. Platinum Sensor
    e. 10K thermistor

3. 8 Universal Outputs

    a. 0-20 mA
    b. 12 VDC relay driver
    c. Individually short circuit protected
    d. LED indication

4. 8 Digital Outputs

    a. Triacs
    b. LED indication

5. The controller shall come with an on board regulated 20 VDC power supply rated at 100 mA.

6. The controller shall have removable terminals for:

    a. 24 VAC Power inputs
    b. MS/TP Communication terminals

7. Stand-alone mode control functions operate regardless of network status. Functions include the following:

    a. Peer to peer primary network level communications supporting BACnet objects and services according to PIC and BIBBs statement.
    b. Automatic communications loss detection to maintain normal control functionality regardless of available networks communications.
    c. Discrete/digital, analog, and pulse input/outputs.
    d. Monitoring, controlling, or addressing data points.
    e. Local energy management control strategies
    f. Incorporate internal customizable safeties and limits to prevent third party BACnet tools from providing improper and unrealistic inputs to AACs.

8. Local operator interface port provides for download from and connection to portable workstation.

9. Communication:

a. The Advanced Application Controller shall communicate via the Primary Controller Network between BAS Controllers and other BACnet devices.
b. Communication shall be peer-peer.
c. AACs shall communicate with and other BACnet devices at a baud rate selectable between 9.6 and 76.8 Baud using MS/TP communications protocol.
d. AAC shall communicate with the UNC using:

1) RS-485 trunk with a baud rate selectable between 9.6 and 76.8 Kbaud using MSTP communications protocol.
2) An Ethernet trunk 10/100 Mb using BACnet IP.

2.5 UNITARY EQUIPMENT CONTROLLER UNITS (BACNET APPLICATIONS):

A. Single board construction comprising processor board with programmable, nonvolatile, RAM/EEPROM memory for custom control and unitary applications. UECs shall be provided for Unit Ventilators, Fan Coils, Heat Pumps, Rooftop Units, and other applications as shown on the drawings. To assure complete interoperability, all UECs firmware shall support all BACnet objects and services as called out in the PIC and BIBBs statement.

B. The Unitary Equipment Controller shall have the following point count as a minimum.

1. 6 Universal Inputs

a. 0-20mA
b. 0-5 VDC
c. Balco Sensors
d. Platinum Sensor
e. 10K thermistor

2. 4 Analog Outputs

a. 0-20 mA
b. 0-5/10 VDC
c. Individually short circuit protected

3. 8 Digital Outputs

a. Triacs
b. LED indication

C. Units monitor or control each input/output point; process information; and download from the operator station.

D. The controller shall have removable terminals for:

1. 24 VAC Power inputs
2. MS/TP Communication terminals

E. Stand-alone mode control functions operate regardless of network status. Functions include the following:

1. Peer to peer primary network level communications with automatic communications loss detection to maintain normal control functionality regardless of available network communications.
2. Discrete/digital, analog, and pulse input/output.
3. Monitoring, controlling, or addressing data points.
4. Appropriate BACnet Objects for specific unitary applications.

F. Local operator interface port located on UEC and UEC sensor provides for download from or upload to portable workstation. All bus devices shall be accessible from either port.

G. Communication: UECs shall communicate with the UNC and ACC at a baud rate selectable of 9.6-76.8 Kbaud utilizing MS/TP.

H. UEC units monitor or control each input/output point; process information; and at least 50 expressions for customized HVAC control including mathematical equations, Boolean logic, PID control loops with anti-windup, sequencers, timers, interlocks, thermostats, counters, interlocks, compare, limit, and alarms.

I. All UEC Controller setpoints shall be digital display setpoints with dual setpoint limits (integral hard limits which the user cannot exceed above and below and independent soft limits which are hidden from the user). All digital setpoints shall be network retentive after power outages and after replacement of sensor.

2.6 LANs:

A. Capacity for a minimum of 64 client workstations connected to multi-user, multitasking environment with concurrent capability to access DDC network or control units.

B. Enterprise Network LAN

1. Media: Ethernet (IEEE 802.3), peer-to-peer CSMA/CD, operating at 10 or 100 Mbps, cable 10 Base-T, UTP-8 wire, category 5

C. Primary Controller Network LAN (LonWorks Applications)

1. Media: LonTalk™ (EIA 709.1), peer to peer, FTT-10 operating at 78.8K.

D. Secondary Network LAN (If Required)

1. Media: LonTalk™ (EIA 709.1), peer to peer, FTT-10 operating at 78.8K

E. Primary Controller Network LAN (BACnet Applications)

1. ANSI / ASHRAE™ Standard 135-2004, BACnet protocol

F. Remote Connection

1. ISDN, ADSL, T1 or dial-up connection, monthly charges paid by building owner

2.7 SOFTWARE:

A. Controller and System HVAC Applications

1. Update to latest version of software at Project completion. Include and implement the following capabilities from the control units if documented by the specified sequence of operations:

    a. Load Control Programs: Demand limiting, duty cycling, automatic time scheduling, start/stop time optimization, occupied/unoccupied setback/setup, DDC with PID, and trend logging.
    b. HVAC Control Programs: Optimal run time, supply-air reset, and enthalpy/economizer switchover.
    c. Chiller Control Programs: Chilled water plant optimization with condenser water reset, chilled-water reset, chiller and pump equipment selection and sequencing.
    d. Boiler Control Programs: Boiler plant optimization with hot water supply reset, boiler and pump equipment selection and sequencing.
    e. Programming Application Features: Include trend point, alarm reporting, alarm lockout, weekly scheduling, staggered start, sequencing, anti-short cycling and calculated point.

B. Controller and Network Setup Software

1. Network managements tools for LonTalk™ protocol and the ANSI / ASHRAE™ Standard 135-1995, BACnet protocol shall be provided including a network learn function, LonMark bindings, service pins, winks, and diagnostics.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.2 INSTALLATION

A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.

B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 230993.

C. Electrical material and installation shall be in accordance with appropriate requirements of Electrical Code.

3.3 MANUFACTURER'S FIELD SERVICES

A. Prepare and start systems.

B. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.

1. Leak Test: After installation, fill system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove malfunctioning units, replace with new units, and retest.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment, and retest.
4. Pressure test control for air piping:

    a. Pressure test control air piping at 30 psig. or 1.5 times the operating pressure for 24 hours, with maximum 5 psig. loss.
    b. Pressure test high-pressure control air piping at 150 psig. and low-pressure control air piping at 30 psig. for 2 hours, with maximum 1 psig.

5. Calibration and test electric/electronic thermostats by disconnecting input sensors and stimulating operation with compatible signal generator.

B. Replace damaged or malfunctioning controls and equipment.

1. Start, test, and adjust control systems.
2. Demonstrate compliance with requirements, including calibration and testing, and control sequences.
3. Adjust, calibrate, and fine tune circuits and equipment to achieve sequence of operation specified.

C. Verify DDC as follows:

1. Verify software including automatic restart, control sequences, scheduling, reset controls, and occupied/unoccupied cycles.
2. Verify operation of local operator workstation.
3. Verify local control units including self-diagnostics.

3.5 TRAINING

A. Provide service engineer to instruct Owner’s representative in operation of systems plant equipment. Offsite training shall consist of a 3 day class at a facility within 100 miles of project site. On site training shall consist of 16 hour period initially in increments of 4 hours and another 40 hours at times of the owner's choosing. This time shall be for training only, not maintenance of system. Contractor shall prepare a time log sheet, obtaining owner’s signature after training sessions and provide updates to owner after each session until training time is complete.

3.6 INPUT/OUTPUT SCHEDULES

A. See Specification Section 230993 - “Sequence of Operations”.

END OF SECTION 23 09 23

SECTION 23 09 93 - SEQUENCE OF OPERATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Fan powered boxes.
2. Computer room cooling units.

1.3 SUBMITTALS

A. See Division 01 for project requirements.

B. Shop Drawings: Indicate mechanical system controlled and control system components.

1. Label with settings, adjustable range of control and limits. Submit written description of control sequence.
2. Submit flow diagrams for each control system, graphically depicting control logic.
3. Submit draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.

1.4 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of components and set points of controls, including changes to sequences made after submission of shop drawings.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 GENERAL

A. Temperature control system shall be an extension of existing BAS and be a combination of electric and electronic controls. All DDC control points listed in this section shall be performed by the DDC system and displayed on head end computer. Any other control work required to complete the sequence of operation herein specified shall be electric or electronic temperature controls. Contractor shall provide all power wiring/conduit, transformers, relays etc. necessary for a complete operating system. At contractor's option, entire control system specified herein may be DDC.

B. For future work, new DDC system head end equipment, main panels, and software shall have capability and sufficient capacity to control entire existing building plus 20 percent spare capacity, including available Input/Output points.

C. Thermostat Features shall be provided as follows:

1. Classrooms: +/- 3 degree F. adjustment, override button.
2. Offices: +/- 3 degree F. adjustment, override button.
3. Group rooms: override button.
4. Common spaces: none.

3.2 FAN POWERED BOXES

A. See control diagram on drawings.

B. New equipment operation and points shall be coordinated with the existing fan powered boxes programmed into the existing BAS.

C. Occupied/unoccupied status of fam powered box shall be determined by status of associated rooftop or air handling unit.

D. Room occupancy sensor furnished and installed by electrical contractor shall provide indication of room vacancy. BAS contractor shall utilize spare contacts at occupancy sensor and provide all subsequent wiring as required. (See floor plans for spaces provided with occupancy sensors.)

E. Occupied operation:

1. Fan powered box fan shall operate continuously.
2. When primary air system is operating, thermostat shall modulate primary variable volume damper to proportion air flow from central system.
3. As room thermostat senses reduced cooling demand, volume damper shall close to maintain minimum setpoint as diagramed on drawing.
4. If central duct system pressure varies, volume damper shall maintain constant primary air flow.
5. As room thermostat senses no cooling requirement, control system shall close damper to minimum position. Before heating is initiated, control shall enter field adjustable no load band.
6. On sensing need for heat, heating coil control valve shall modulate open while primary air damper maintains minimum position as diagramed.

F. Occupied, vacant operation (where applicable):

1. Upon indication that room is vacant via room occupancy sensor, fan shall stop and primary variable volume damper shall close.
2. Box shall enter 100% heating mode with fan on, primary air damper closed, and heating coil valve open as required to maintain room temperature no more than 3 degrees F. (adj.) below room setpoint.
3. Box shall enter 100% cooling mode with fan on, primary air damper open, and heating coil valve closed as required to maintain room temperature no more than 3 degrees F. (adj.) above room setpoint.
4. Upon indication that room is no longer vacant via room occupancy sensor, box shall resume normal occupied operation.

G. Unoccupied operation:

1. Fan powered box shall be off.
2. Fan shall cycle on as required in 100% heating mode with heating coil valve open and primary air damper closed to maintain night setback temperature of 60 degrees f.

H. Input/Output Schedule (Minimum points required, typical for each):

1.	Fan start/stop	DO
2.	Fan status	DI
3.	Space temperature	AI
4.	Space temperature setpoint	AO or software
5.	Damper	AO
6.	Hot water heating coil	AO
7.	Velocity Sensor	AI
8.	Occupancy sensor	DI
9.	Discharge air temperature	AI
10.	Discharge temperature	AI
11.	Computer graphic display of system	---

3.3 COMPUTER ROOM COOLING UNITS

A. General:

1. Unit will be furnished with all control devices, wiring, etc. for manufacturer's standard CV sequence. Unit manufacturer shall provide interface panel compatible with BAS system for read and write communication of all available information with BAS system head end computer.
2. Upon receiving signal from fire alarm system, system shall shut down. BAS contractor shall provide contacts for receiving signal at system DDC controller and subsequent control wiring and devices necessary to shut down system.
3. Lead/lag status of room units shall be alternated weekly or by-weekly so as to equalize run time on fans - change shall be made during the daytime when building maintenance staff is on duty.
4. On call for cooling, room thermostat shall operate system supply fan and system condensing unit stages as required to maintain setpoint.
5. On call for dehumidification, room humidistat shall operate system supply fan, condensing unit, and operate electric re-heat coil as required to maintain humidity setpoint. If lead unit is at full capacity and space humidity rises above setpoint, lag unit shall start and BAS shall alarm.

6. On call for humidification, room humidstat shall operate system supply fan and operate integral humidifier as required to maintain humidity setpoint. If lead unit is at full capacity and space humidity falls below setpoint, lag unit shall start and BAS shall alarm.

B. Input/Output Schedule (minimum points required):

1.	Supply fan start/stop (ea. unit)	DO
2.	Supply fan status (ea. unit)	DI
3.	Space temperature setpoint	Software
4.	Space temperature	AI
5.	Space humidity setpoint	Software
6.	Space humidity	AI
7.	Lead circuit compressor(s) (ea. unit, ea. circuit)	AO
8.	Lag circuit compressor(s) (ea. unit, ea. circuit)	DO
9.	Humidfier (ea. unit)	AO
10.	Reheat coil (ea. unit)	AO
11.	Discharge temperature (ea. unit)	AI
12.	Computer graphic display of system	--

END OF SECTION 23 09 93

SECTION 23 21 16 - HYDRONIC PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Pressure gages.
2. Pressure gage taps.
3. Thermometers.
4. Thermometer supports.
5. Test plugs.
6. Flexible connectors.
7. Air vents.
8. Strainers.
9. Circuit Balancing Valves.
10. Relief valves.

1.3 REFERENCES

A. American Society of Mechanical Engineers:

1. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
2. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.

B. ASTM International:

1. ASTM E2251 - Standard Specification for ASTM Thermometers.
2. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers.

C. American Water Works Association:

1. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
2. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.

D. Underwriters Laboratories Inc.:

1. UL 393 - Indicating Pressure Gauges for Fire-Protection Service.
2. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service.

1.4 PERFORMANCE REQUIREMENTS

A. Flexible Connectors: Provide at or near pumps and motorized equipment where piping configuration does not absorb vibration.

1.5 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Submit for manufactured products and assemblies used in this Project.

1. Manufacturer’s data indicating use, operating range, total range, accuracy, and location for manufactured components.
2. Submit product description, model, dimensions, component sizes, rough-in requirements, service sizes, and finishes.
3. Submit schedule indicating manufacturer, model number, size, location, rated capacity, load served, and features for each piping specialty.
4. Submit electrical characteristics and connection requirements.

C. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures, application, selection, and hookup configuration. Include pipe and accessory elevations.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of actual locations of components and instrumentation, controls, and meters.

C. Operation and Maintenance Data: Submit instructions for calibrating instruments, installation instructions, assembly views, servicing requirements, lubrication instruction, and replacement parts list.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.8 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Accept piping specialties on site in shipping containers with labeling in place. Inspect for damage.

C. Provide temporary protective coating on cast iron and steel valves.

D. Protect systems from entry of foreign materials by temporary covers, caps and closures, completing sections of the work, and isolating parts of completed system until installation.

1.10 ENVIRONMENTAL REQUIREMENTS

A. See Division 01 for project requirements.

B. Do not install instruments when areas are under construction, except rough in, taps, supports and test plugs.

1.11 FIELD MEASUREMENTS

A. Verify field measurements before fabrication.

1.12 MAINTENANCE SERVICE

A. See Division 01 for project requirements.

B. Furnish service and maintenance of glycol fluid and glycol charging components for two years from Date of Substantial Completion.

C. Furnish monthly visits for one year starting from Date of Substantial Completion to make glycol fluid concentration analysis on site with refractive index measurement instrument. Detail findings with maintenance personnel in writing of corrective actions needed including analysis and amounts of glycol or water added.

1.13 MAINTENANCE MATERIALS

A. See Division 01 for project requirements.

1.14 EXTRA MATERIALS

A. See Division 01 for project requirements.

PART 2 - PRODUCTS

2.1 PRESSURE GAGES

A. Gage: ASME B40.1, with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.

1. Case: Steel.
2. Bourdon Tube: Brass.
3. Dial Size: 2-1/2 inch.
4. Mid-Scale Accuracy: two percent.
5. Scale: Psi.

2.2 PRESSURE GAGE TAPS

A. Needle Valve: Brass, 1/4 inch NPT for minimum 300 psi.

B. Ball Valve: Brass, 1/4 inch NPT for 250 psi.

C. Pulsation Damper: Pressure snubber, brass with 1/4 inch NPT connections.

D. Siphon: Steel, Schedule 40, 1/4 inch NPT angle or straight pattern.

2.3 STEM TYPE THERMOMETERS

A. Thermometer: ASTM E1, red appearing non-mercury, lens front tube, cast aluminum case with enamel finish.

1. Size: 9 inch scale.
2. Window: Clear glass.
3. Stem: Brass.
4. Accuracy: ASTM E77, 2 percent.
5. Calibration: Degrees F.

2.4 THERMOMETER SUPPORTS

A. Socket: Brass separable sockets for thermometer stems with or without extensions, and with cap and chain.

B. Flange: 3 inch outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.

2.5 TEST PLUGS

A. 1/4 inch NPT or 1/2 inch NPT brass or stainless steel fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with:

1. Neoprene core for temperatures up to 200 degrees F.
2. Nordel core for temperatures up to 350 degrees F.
3. Viton core for temperatures up to 400 degrees F.

B. Test Kit:

1. Carrying case, internally padded and fitted containing:

a. Two 2-1/2 inch diameter pressure gages.

1) Scale range: as applicable to installed systems.

b. Two gage adapters with 1/8 inch probes.
c. Two 1 inch dial thermometers.

1) Scale range: as applicable to installed systems.

2.6 FLEXIBLE CONNECTORS

A. Corrugated stainless steel or bronze hose with single layer of exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure 300 psig.

2.7 AIR VENTS

A. Manufacturers:

1. Bell & Gossett, ITT.
2. Armstrong.
3. Dunham Bush.
4. Taco.
5. American Wheatley.
6. FloFab.

B. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.

C. Float Type:

1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
2. High Capacity: Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.

D. Washer Type:

1. Brass with hydroscopic fiber discs, vent ports, adjustable cap for manual shut-off, and integral spring loaded ball check valve.

2.8 CIRCUIT BALANCING VALVES

A. Manufacturers:

1. Bell & Gossett. Basis of Design: “Circuit Setter”.
2. Dunham Bush.
3. Armstrong.
4. Tour & Andersson.
5. Taco.

B. Application: Balancing of individual hydronic equipment.

C. Balancing Valve Characteristics:

1. All balancing valves shall exhibit an accuracy of +/- 5% within the normal operating range.
2. All balancing valves shall have integral self-sealing metering ports for measuring differential pressure, flow rates and temperature. Ports shall be protected with individual threaded caps.
3. All balancing valves must off 100% positive, leakproof shutoff against the same fluid pressure as the valve body rating to a nominal value of 300 degrees F at 250 psi.
4. All balancing valves in sizes 1/2" to 2" shall have a digital handwheel for positioning accuracy; provide a transparent dust/paint cover to prevent destruction of the digits during construction.
5. All balancing valves must offer a hidden memory feature to prevent unauthorized adjustment and to ensure a return to the original setting after shutoff.
6. All balancing valves sized 1/2" to 6" shall be provided with factory insulation. The flame retardant insulation shall meet ASTM E-84 specifications with a flame spread rating of 25 or less and a smoke development rating of 50. Insulation will have an "R" factor value of 4.5
7. Balancing valves 1/2" to 2" must include a drain/fill connection suitable for hose bon attachment and with a threaded protective cap. the true drain/fill connection must be installable while the system is operating, without leaking or requiring shutdown of associated piping.
8. All balancing valves in sizes 1/2" to 2" shall be manufactured from pressure die cast dezincification resistant AMETAL copper alloy which does not require dielectric fittings. Valve bodies in sizes 2 1/2" to 12" shall be manufactured from a cast iron equivalent to ASTM-35B with all wetted, moving parts of dezincification resistant AMETAL copper alloy.
9. All balancing valves shall be selected and sized to perform in a normal operating range of 75% of the full open position, at a differential pressure of approximately 1 to 3' w.g.

2.9 VENTURI FLOW METER

A. Manufacturers:

1. Bell & Gossett. Basis of Design: “Model MV”.
2. Dunham Bush.
3. Armstrong.
4. Tour & Andersson.
5. Taco.

B. Application: Balancing of auxiliary one-pipe loops.

C. Description: Valve to be a combination calibrated balance, commissioning, and positive shut-off valve for use in HVAC systems. Valve shall employ an efficient brass venturi design to provide accurate flow balancing with minimal system pressure loss. Valves shall be furnished with two pressure/temperature ports, standard port ball or butterfly valve with memory stop, and a hanging ID tag.

D. Construction:

1. Body: Brass.
2. Ball: Chrome Plated.
3. Ball Seat: Teflon.
4. Stem: Explosion Proof.
5. O-Rings: EPDM.

6. Handle: Chrome plated steel with vinyl cover.

E. Characteristics:

1. Working Pressure: 400 psig.
2. Temperature Range: -4 deg. F to 250 deg. F.
3. Accuracy: +/- 5% between 5" w.c. and 150" w.c.

2.10 FPB COIL VALVE PACKAGES (In Lieu of Individual Valves, at Contractor's Option)

A. Acceptable Manufacturers:

1. Nexus
2. Griswold.
3. Flowset.
4. Hayes.
5. NuTech.
6. IMI Flow Design

B. Minimum Component Requirements per Installation:

1. Manual Flow Control Valve (MFCV a.k.a. Manual Balance Valve).
2. "Y" Strainer (where indicated on drawings).
3. Temperature Control Valve (TCV)
4. Union Connections at Coil.
5. Air Vent on Return Side.
6. Blowdown/Drain Valve on Supply Side.
7. Pressure/Temperature Test Plugs Across Coil.
8. Full Port, Union End Ball Valves or Butterfly Valve for Shutoff.

C. Materials of Construction:

1. Brass, Bronze or Stainless Steel Metals (2" and smaller).
2. Teflon Seats, Viton Seals (2" and smaller).

D. Installation:

1. Installation shall conform to basic piping methods specifications.
2. All components shall be isolated by shutoff valves.
3. Flexible hoses may be installed at coil connections (provided by valve package manufacturer).
4. Union tail pieces may be used to reduce pipe sizes to match coil and TVC valve sizes.
5. Pressure/Temperature test plugs shall be installed across coil.
6. A "Y" strainer shall be installed on the supply side.
7. Unions shall be used to isolate the coil, MFCV and TCV.

E. Shutoff Valves, 2" and smaller shall be full port, forged brass ball valves with:

1. A minimum rating of 600 psi WP, 325 degrees F.
2. Interchangeable union end with Viton o-ring seal (ground joint is not acceptable).
3. Multiple 1/4" tapped ports for test plugs, vent, and/or drain.
4. Blowout-proof stem with dual Viton o-ring seals.
5. Hard chrome plated ball with Teflon seats; like Nexus Ultra series.

F. Manual Flow Control Valves, 2" and smaller shall be combination metering/balance type of forged brass construction with:

1. A modified venturi equipped with test plugs and an ID tag.
2. A combination shut-off and memory stop device indicating degree of opening.
3. A rating of 600 WOG, 325 degrees F.
4. An interchangeable union end with Viton o-ring type seal.
5. Blowout proof stem with dual Viton o-ring type seal.
6. Hard chrome plated ball with Teflon seats like Nexus Ultra XB Orturi.

G. Temperature Control Valves: To be provided under separate contract.

H. Combination Strainer/Ball valves, 2" and smaller used for supply side shutoff and strainer requirements shall be forged brass construction with:

1. A minimum rating of 600 WOG, 325 degrees F.
2. Interchangeable union end with Viton o-ring seal.
3. Multiple 1/4" tapped ports for test plugs, vent, or other accessories.
4. Blowout-proof stem with dual viton o-ring seals.
5. Hard chrome plated ball with Teflon seats.
6. A 20 mesh 304 stainless steel filter screen, accessible without affecting the valve piping.
7. A port in the filter cap for a blowdown/drain valve; like Nexus UltraY or approved equal.

I. Blowdown/Drain Valves shall be full port, forged brass ball valve construction with:

1. A minimum rating of 600 WOG, 325 degrees F.
2. Blowout-proof stem with dual viton o-ring seals.
3. Hard chrome plated ball with Teflon seats.
4. A 3/4" hose end and cap with retainer; like Nexus BD.

J. Unions, 2" and smaller shall be full port forged brass with:

1. A minimum of 600 WOG, 325 degrees F.
2. Multiple 1/4" tapped ports for test plugs, vent and/or drain valves.
3. Viton o-ring seal (ground joint are not acceptable); like Nexus UltraU.

K. Accessories to coil piping components shall conform to the following:

1. Pressure/Temperature Test Plugs shall be rated for 1000 psi, 350 degrees F, with brass body, Nordel check plugs and sealed cap; like Sisco BNO series.
2. Manual Air Vents shall be of brass construction and rated at 400 psi, 325 degrees F; like Nexus MV or approved equal.
3. Shaft Extensions (valves 2" and smaller) for insulated pipe shall be at least 2 1/4" tall and constructed of brass with a stationary external shaft housing; like Nexus ES.
4. Flexible hoses shall be designed for water, full port, fire retarding and conform to ASTM codes E84 and E81A, with 304 stainless steel outer braid; hoses up to 1" shall have an EPDM Kevlar reinforced tube core, brass end fittings and a minimum rating of 400 psi, 250°F; hoses over 1" shall have stainless steel bellows core, steel end fittings and a minimum rating of 450 psi, 500°F. All hoses shall be a minimum of 24" in length or as noted on the drawings. All hoses shall have at least one union or swivel end fittings like Nexus UltraFlex.

2.11 RELIEF VALVES

A. Manufacturers:

1. Bell & Gossett, ITT.
2. Armstrong.
3. Watts.
4. Taco.
5. FloFab.

B. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated capacities ASME certified and labeled.

PART 3 - EXECUTION

3.1 INSTALLATION - THERMOMETERS AND GAGES

A. Install gage taps in piping.

B. Install pressure gages with pulsation dampers. Provide needle valve or ball valve to isolate each gage. Extend nipples to allow clearance from insulation.

C. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches for installation of thermometer sockets. Allow clearance from insulation.

D. Install thermometer sockets adjacent to controls systems thermostat, transmitter, or sensor sockets.

E. Coil and conceal excess capillary on remote element instruments.

F. Provide instruments with scale ranges selected according to service with largest appropriate scale.

G. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

H. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

3.2 INSTALLATION - HYDRONIC PIPING SPECIALTIES

A. Locate test plugs adjacent to control device sockets.

B. Where large air quantities accumulate, provide enlarged air collection standpipes.

C. Install manual air vents at system high points.

D. For automatic air vents in ceiling spaces or other concealed locations, install vent tubing to nearest drain.

E. Provide drain and hose connection with valve on strainer blow down connection.

F. Select system relief valve capacity greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.

G. Pipe relief valve outlet to nearest floor drain.

H. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.

I. Install all TC furnished control valves and wells in piping as directed by the temperature control contractor.

J. Provide circuit balancing valves at all terminal heating units.

K. Provide and install structural steel columns, beams, channels and other supports as required to suspend expansion tanks from structure above or adjacent wall or floor as required. Do not support from lower chord of bar joists.

L. Provide manufacturer insulated valve covers.

3.3 FIELD QUALITY CONTROL

A. See Division 01 for project requirements.

B. Test for strength of glycol and water solution and submit written test results.

3.4 CLEANING

A. See Division 01 for project requirements.

B. Clean and flush glycol system before adding glycol solution.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. See Division 01 for project requirements.

B. Do not install hydronic pressure gauges until after systems are pressure tested.

3.6 APPLICATION OF HYDRONIC SPECIALTIES

A. Pressure Gage Tapping Location:

1. Control valves 3/4 inch & larger - inlets and outlets.
2. Major coils - inlets and outlets.

B. Thermometer Socket Location:

1. Control valves 1 inch & larger - inlets and outlets.
2. Reheat coils - inlets and outlets.

END OF SECTION 23 21 16

SECTION 23 23 00 - REFRIGERANT PIPING AND SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Refrigerant piping.
2. Unions, flanges, and couplings.
3. Refrigerant moisture and liquid indicators.
4. Valves.
5. Refrigerant strainers.
6. Refrigerant pressure regulators.
7. Refrigerant pressure relief valves.
8. Refrigerant filter-driers.
9. Refrigerant solenoid valves.
10. Refrigerant expansion valves.
11. Electronic expansion valves.
12. Refrigerant receivers.

1.3 REFERENCES

A. Air-Conditioning and Refrigeration Institute:

1. ARI 495 - Refrigerant Liquid Receivers.
2. ARI 710 - Liquid-Line Driers.
3. ARI 730 - Flow-Capacity Rating and Application of Suction-Line Filters and Filter Dryers.
4. ARI 750 - Thermostatic Refrigerant Expansion Valves.
5. ARI 760 - Solenoid Valves for Use with Volatile Refrigerants.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 15 - Safety Code for Mechanical Refrigeration.

C. American Society of Mechanical Engineers:

1. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
2. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
3. ASME B31.5 - Refrigeration Piping.
4. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.

D. ASTM International:

1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

2. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
3. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
4. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
5. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
6. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.

E. American Welding Society:

1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
2. AWS D1.1 - Structural Welding Code - Steel.

F. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

G. Underwriters Laboratories Inc.:

1. UL 429 - Electrically Operated Valves.

1.4 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified, provide compatible system components and joints. Use non-conducting dielectric connections when joining dissimilar metals in systems.

B. Provide flanges, unions, or couplings at locations requiring servicing. Use unions, flanges, or couplings downstream of valves and at equipment connections. Do not use direct welded or threaded connections to valves or equipment.

C. Provide pipe hangers and supports in accordance with ASME B31.5, ASTM F708, MSS SP 58, MSS SP 69, and MSS SP 89.

D. Provide receivers on systems as recommended by condensing unit manufacturer, sized to accommodate pump down charge.

E. Provide receivers on systems with piping runs exceeding as recommended by condensing unit manufacturer.

F. Flexible Connectors: Use at or near compressors where piping configuration does not absorb vibration.

1.5 SUBMITTALS

A. See Division 01 for project requirements.

B. Shop Drawings: Indicate layout of refrigeration piping system, including equipment, critical dimensions, and sizes.

C. Product Data:

1. Piping: Submit data on pipe materials, fittings, and accessories.
2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
3. Hangers and Supports: Submit manufacturers catalog information including load capacity.
4. Refrigerant Specialties: Submit manufacturers catalog information including capacity, component sizes, rough-in requirements, and service sizes for the following:

    a. Refrigerant moisture and liquid indicators.
    b. Refrigerant strainers.
    c. Refrigerant pressure regulators.
    d. Refrigerant pressure relief valves.
    e. Refrigerant filter-driers.
    f. Refrigerant solenoid valves.
    g. Refrigerant expansion valves.
    h. Electronic expansion valves.

D. Design Data: Indicate pipe size. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Test Reports: Indicate results of refrigerant leak test and piping system pressure test.

F. Manufacturer's Installation Instructions: Submit hanging and support methods, joining procedures and isolation.

G. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.6 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of valves, equipment and refrigerant accessories.

C. Operation and Maintenance Data: Submit instructions for installation and changing components, spare parts lists, exploded assembly views.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with ASME B31.5 code for installation of refrigerant piping systems.

1.8 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Fabricator or Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.10 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Dehydrate and charge refrigeration components including piping and receivers, seal prior to shipment. Maintain seal until connected into system.

C. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.11 ENVIRONMENTAL REQUIREMENTS

A. See Division 01 for project requirements.

1.12 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.13 COORDINATION

A. See Division 01 for project requirements.

1.14 WARRANTY

A. See Division 01 for project requirements.

1.15 MAINTENANCE MATERIALS

A. See Division 01 for project requirements.

B. Furnish two refrigerant oil test kits each containing everything required for conducting one test.

1.16 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two packing kits for each size and valve type.

C. Furnish two refrigerant filter-dryer cartridges of each type.

PART 2 - PRODUCTS

2.1 REFRIGERANT PIPING

A. Copper Tubing: ASTM B280, Type ACR hard drawn or annealed.

1. Fittings: ASME B16.22 wrought copper.
2. Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.

2.2 UNIONS, FLANGES, AND COUPLINGS

A. 2 inches and Smaller:

1. Copper Pipe: Bronze, soldered joints.

B. 2-1/2 inches and Larger:

1. Copper Piping: Bronze.
2. Gaskets: 1/16 inch thick preformed neoprene.

C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.3 REFRIGERANT MOISTURE AND LIQUID INDICATORS

A. Indicators:

1. Port: Single, UL listed.
2. Body: Copper or brass, flared or solder ends.
3. Sight glass: Color-coded paper moisture indicator with removable element cartridge and plastic cap.
4. Maximum working pressure: 500 psig.
5. Maximum working temperature: 200 degrees F.

2.4 VALVES

A. Diaphragm Packless Valves:

1. UL listed, globe or angle pattern, forged brass body and bonnet solder or flared ends.
2. Phosphor bronze and stainless steel diaphragms, rising stem and hand wheel.
3. Stainless steel spring, nylon seats, disc with positive back seating.
4. Maximum working pressure: 500 psig.
5. Maximum working temperature: 275 degrees F.

B. Packed Angle Valves:

1. Forged brass or nickel-plated forged steel, solder or flared ends.
2. Forged brass seal caps with copper gasket, rising stem and seat [with back seating], molded stem packing.
3. Maximum working pressure: 500 psig.
4. Maximum working temperature: 275 degrees F.

C. Ball Valves:

1. Two piece forged brass body with teflon ball seals and copper tube extensions, brass seal cap, chrome plated ball, stem with neoprene ring stem seals, soldered or threaded ends.
2. Maximum working pressure: 500 psig.
3. Maximum working temperature: 300 degrees F.

D. Service Valves:

1. Forged brass body with copper stubs, brass caps, removable valve core, [integral ball check valve,] flared or solder ends.
2. Maximum working pressure: 500 psig.

E. Refrigerant Check Valves:

1. Globe Type:

a. Cast bronze or forged brass body, forged brass cap with neoprene seal, brass guide and disc holder, phosphor-bronze or stainless steel spring, teflon seat disc.
b. Maximum working pressure: 425 psig.
c. Maximum working temperature: 300 degrees F.

2. Straight Through Type:

a. Spring, neoprene seat.
b. Maximum working pressure: 500 psig.
c. Maximum working temperature: 200 degrees F.

2.5 REFRIGERANT STRAINERS

A. Straight Line or Angle Line Type:

1. Brass or steel shell, steel cap and flange, and replaceable cartridge, with screen of stainless steel wire or monel reinforced with brass.

2. Maximum working pressure: 430 psig.

B. Straight Line, Non-Cleanable Type:

1. Steel shell, copper plated fittings, stainless steel wire screen.
2. Maximum working pressure: 400 psig.

2.6 REFRIGERANT PRESSURE REGULATORS

A. Brass body, stainless steel diaphragm, direct acting or pilot operated with remote pressure pilot, adjustable over 0 to 80 psig range, for maximum working pressure of 450 psig.

2.7 REFRIGERANT PRESSURE RELIEF VALVES

A. Straight Through or Angle Type: Brass body and disc, neoprene seat, factory sealed and stamped with ASME UV and National Board Certification NB; for standard 300 psig setting; selected to ASHRAE 15.

2.8 REFRIGERANT FILTER-DRIERS

A. Replaceable Cartridge Angle Type:

1. Shell: ARI 710, UL listed, brass, or steel, removable cap, for maximum working pressure of 500 psig,.
2. Filter Cartridge: Pleated media with integral end rings, stainless steel support.
3. Filter/Dryer Cartridge: Pleated media with solid core sieve with activated alumina.
4. Wax Removal Cartridge: Molded bonded core of activated charcoal with integral gaskets.

B. Permanent Straight Through Type:

1. ARI 710, UL listed, steel shell with molded desiccant filter core, for maximum working pressure of 500 psig..

2.9 REFRIGERANT SOLENOID VALVES

A. Valve: ARI 760, pilot operated, copper or brass or steel body and internal parts, synthetic seat, stainless steel stem and plunger assembly, with flared, solder, or threaded ends; for maximum working pressure of 500 psig. Stem designed to allow manual operation in case of coil failure.

B. Coil Assembly:UL listed, replaceable with molded electromagnetic coil, moisture and fungus proof, with surge protector and color coded lead wires, integral junction box with pilot light.

2.10 REFRIGERANT EXPANSION VALVES

A. Angle or Straight Through Type: ARI 750; design suitable for refrigerant, brass body, internal or external equalizer, superheat setting, replaceable inlet strainer, with capillary tube and remote sensing bulb.

B. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum 10 degrees F superheat. Select to avoid being undersized at full load and oversized at part load.

2.11 ELECTRONIC EXPANSION VALVES

A. Valve:

1. Brass bodies with flared or solder connection, needle valve with floating needle and machined seat, stepper motor drive.
2. Capacity: Match equipment rating.

B. Evaporation Control System:

1. Electronic microprocessor based unit in enclosed case, proportional integral control with adaptive superheat, maximum operating pressure function, pre-selection allowance for electrical defrost and hot gas bypass.

C. Refrigeration System Control: Electronic microprocessor based unit in enclosed case, with proportional integral control of valve, on/off thermostat, air temperature alarm (high and low), solenoid valve control, liquid injection adaptive superheat control, maximum operating pressure function, night setback thermostat, timer for defrost control.

2.12 REFRIGERANT RECEIVERS

A. Internal Diameter 6 inch and Smaller: ARI 495, UL listed, steel, brazed; 400 psig maximum pressure rating, with taps for inlet, outlet, and pressure relief valve.

B. Internal Diameter 6 inch and Larger: ARI 495, welded steel, tested and stamped in accordance with ASME Section VIII; 400 psig with taps for liquid inlet and outlet valves, pressure relief valve, and magnetic liquid level indicator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - INSERTS

A. Provide inserts for placement in concrete forms.

B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.

D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

3.4 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Install hangers and supports in accordance with ASME B31.5, ASTM F708, and MSS SP 89.

B. Support horizontal piping hangers as scheduled.

C. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

D. Place hangers within 12 inches of each horizontal elbow.

E. Install hangers to allow 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

F. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

G. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.

H. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

I. Install pipe hangers and supports in accordance with Section 23 05 29.

3.5 INSTALLATION - ABOVE GROUND PIPING SYSTEMS

A. Route piping parallel to building structure and maintain gradient.

B. Install piping to conserve building space, and not interfere with use of space.

C. Group piping whenever practical at common elevations.

D. Sleeve pipe passing through partitions, walls and floors. Refer to Section 23 05 29.

E. Install pipe identification in accordance with Section 23 05 53.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide access where valves and fittings are not exposed.

H. Arrange refrigerant piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.

I. Flood refrigerant piping system with nitrogen when brazing.

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds. Refer to Section 05 12 00.

K. Prepare unfinished pipe, fittings, supports, and accessories, ready for finish painting. Refer to Section 09 90 00.

L. Install valves with stems upright or horizontal, not inverted.

M. Insulate piping and equipment; refer to Section 23 07 00.

N. Provide replaceable cartridge filter-dryers, with isolation valves and bypass with valve.

O. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.

P. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.

Q. Install flexible connectors at right angles to axial movement of compressor, parallel to crankshaft.

R. Provide electrical connection to solenoid valves. Refer to Section 26 05 03.

S. Fully charge completed system with refrigerant after testing.

T. Follow ASHRAE 15 procedures for charging and purging of systems and for disposal of refrigerant.

U. Install refrigerant piping in accordance with ASME B31.5.

3.6 INSTALLATION - REFRIGERANT SPECIALTIES

A. Refrigerant Liquid Indicators:

1. Install line size liquid indicators in main liquid line downstream of condenser.
2. When receiver is provided, install line size liquid indicators in liquid line downstream of receiver.
3. Install line size liquid indicators downstream of liquid solenoid valves.

B. Refrigerant Valves:

1. Install service valves on compressor suction and discharge.
2. Install gage taps at compressor inlet and outlet.
3. Install gage taps at hot gas bypass regulators, inlet and outlet.
4. Install check valves on compressor discharge.
5. Install check valves on condenser liquid lines on multiple condenser systems.

6. Install refrigerant charging valve in liquid line between receiver shut-off valve and expansion valve.

C. Strainers:

1. Install line size strainer upstream of each automatic valve.
2. Where multiple expansion valves with integral strainers are used, install single main liquid-line strainer.
3. On steel piping systems, install strainer in suction line.
4. Install shut-off valves on each side of strainer.

D. Install pressure relief valves on ASME receivers. Install relief valve discharge piping to terminate outdoors.

E. Filter-Dryers:

1. Install permanent filter-dryers in low temperature systems.
2. Install permanent filter-dryer in systems containing hermetic compressors.
3. Install replaceable cartridge filter-dryer vertically in liquid line adjacent to receivers.
4. Install replaceable cartridge filter-dryer upstream of each solenoid valve.

F. Solenoid Valves:

1. Install in liquid line of systems operating with single pump-out or pump-down compressor control.
2. Install in liquid line of single or multiple evaporator systems.
3. Install in oil bleeder lines from flooded evaporators to stop flow of oil and refrigerant into suction line when system shuts down.

3.7 FIELD QUALITY CONTROL

A. See Division 01 for project requirements.

B. Test refrigeration system in accordance with ASME B31.5.

C. Pressure test refrigeration system with dry nitrogen to 200 psig. Perform final tests at 27 inches vacuum and 200 psig using halide torch or electronic leak detector.

D. Repair leaks.

E. Retest until no leaks are detected.

END OF SECTION 23 23 00

SECTION 23 25 00 - HVAC WATER TREATMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. System cleaner.
2. Closed system treatment (water).
3. Side-stream filter.

B. Installation of equipment furnished under this section:

1. Section 23 05 03 - HVAC Piping: Side-stream filter and chemical pot feeder.
2. Section 23 05 03 - HVAC Piping: Glycol System.

1.3 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Shop Drawings: Indicate system schematic, equipment locations, and controls schematics, electrical characteristics and connection requirements.

C. Product Data: Submit chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.

D. Manufacturer's Installation Instructions: Submit placement of equipment in systems, piping configuration, and connection requirements.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

F. Manufacturers Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of equipment and piping, including sampling points and location of chemical injectors.

C. Operation and Maintenance Data: Submit data on chemical feed pumps, agitators, and other equipment including spare parts lists, procedures, and treatment programs. Include step by step instructions on test procedures including target concentrations.

1.6 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of Project with water analysis laboratories and full time service personnel.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.8 WASTEWATER STANDARDS

A. Discharge from any chemically treated system shall be directed to sanitary sewers and shall not result in contaminant levels which are in excess of standards as set forth by the appropriate water pollution control authorities.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. See Division 01 for project requirements.

1.11 MAINTENANCE SERVICE

A. See Division 01 for project requirements.

B. Furnish technical service visits, and materials (chemical) for one years starting at Date of Substantial Completion, to perform field inspections and make water analysis on site. Detail findings in writing on proper practices, chemical treating requirements and corrective actions needed. Submit two copies of field service report after each visit.

C. Furnish laboratory and technical assistance services during this maintenance period.

D. Furnish on site inspections of equipment during scheduled or emergency shutdown to properly evaluate success of water treatment program, and make recommendations in writing based upon these inspections.

1.12 MAINTENANCE MATERIALS

A. See Division 01 for project requirements.

B. Furnish chemicals for treatment and testing during warranty period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. H-O-H Chemicals.

B. Wet Solutions.

C. Earthwise Environmental, inc.

D. Global Water Technology.

E. IWM.

F. Elemental Solutions.

2.2 SYSTEM CLEANER

A. Basis of Design: H-O-H C-312.

B. Provide chemical that is designed as a multipurpose cleaner used to clean new and existing piping systems, for boiler boil-out and in cleaning new and operational cooling tower systems.

C. Chemical will penetrate, lift and disperse oil, grease, biofilm, and loose corrosion debris and mill residues.

D. Chemical will be a liquid formulation containing potassium hydroxide, tetra-potassium pyrophosphate, and sodium metasilicate, chelating agents and a unique blend of surfactants and wetting agents.

E. Chemical will lift and disperse various organic and inorganic foulants in such a way that they remain uniformly suspended in the water for complete removal through system draining, on-line purge flushing, filtration or a combination of these removal procedures.

F. Chemical must be safely usable with all metals normally used in piping systems, i.e. steel, copper, copper alloys, stainless steel, solder, etc.

G. Chemical does not need to be suitable for use with aluminum or for extended contact with galvanized steel, however, should allow for use in systems galvanized steel components if total exposure time, including flushing, is limited to 24 hours.

H. The cleaning period and time that is required for complete flushing of closed recirculating water systems should not extend beyond 120 hours. If chemical is not completely removed within this time period, elastomers, copper and copper alloys, soldered joints, and mechanical pump seals may be damaged.

I. Chemical may be allowed to contact steel, stainless steel, copper or plastics. Pure Chemical liquid should not be allowed contact aluminum, brass, soldered connections, galvanized metal, painted surfaces, asphalt or rubber roofing materials, fabrics, carpeting or any decorative surfaces. When mixing chemical use polyethylene utensils, tanks and tubing. Alternately, rubber hose, PVC, polypropylene Tygon and vinyl are also acceptable.

2.3 CLOSED SYSTEM TREATMENT (WATER AND GLYCOL)

A. Basis of Design: H-O-H CS-39.

B. Chemical used is to be a complete closed system treatment formulation providing sodium nitrite, tolytriazole and sodium silicate for corrosion inhibition along with sodium tetraborate and other pH and alkalinity-buffering agents.

C. Chemical is intended for use in closed hot and chilled recirculating water systems of all sizes, hot water boilers, engine jacket and other closed recirculating water systems. The combination of corrosion inhibitors in the Chemical must typically hold corrosion in such systems to less than 0.10 mil’s per year, as measured by corrosion test coupons, provided that the basic Chemicals guidelines for closed system treatment are maintained.

PART 3 - EXECUTION

3.1 PREPARATION

A. Operate, fill, start and vent systems prior to cleaning. Use water meter to record capacity in each system. Place terminal control valves in open position during cleaning. Verify that electric power is available and of the correct characteristics.

3.2 CLEANING

A. Prior to acceptance by the owner, all grease, dirt, oil, and metallic oxides shall be removed from each closed recirculating system. Equipment shall be provided to meter the water, filter system water, mix and inject the cleaning solution into the system. Mechanical Contractor shall inform Water Treatment Contractor of all system materials of construction, to insure chemical cleaner compatibility. A cleaning agent shall be circulated, wetting all metal surfaces and flushed from the system at completion.

3.3 CLEANING SEQUENCE

A. Concentration:

1. As recommended by manufacturer.
2. One pound per 100 gallons of water contained in the system.
3. One pound per 100 gallons of water for hot systems and one pound per 50 gallons of water for cold systems.
4. Fill steam boilers only with cleaner and water.

B. Hot Water Heating Systems:

1. Apply heat while circulating, slowly raising temperature to 160 degrees F and maintain for 12 hours minimum.
2. Remove heat and circulate to 100 degrees F or less; drain systems as quickly as possible and refill with clean water.
3. Circulate for 6 hours at design temperatures, then drain.
4. Refill with clean water and repeat until system cleaner is removed.

C. Use neutralizer agents on recommendation of system cleaner supplier and acceptance of Architect/Engineer.

D. Flush open systems [and glycol filled closed systems] with clean water for one hour minimum. Drain completely and refill.

E. Remove, clean, and replace strainer screens.

F. Inspect, remove sludge, and flush low points with clean water after cleaning process is completed. Include disassembly of components as required.

3.4 CLOSED SYSTEM TREATMENT

A. Provide one bypass feeder on each system. Install isolating and drain valves and interconnecting piping. Install around balancing valve downstream of circulating pumps as indicated on Drawings.

B. Introduce closed system treatment through bypass feeder when required or indicated by test.

3.5 SUPERVISION AND SERVICE

A. Water treatment contractor shall provide supervision and service for all phases of water treatment as follows:

1. Field supervision for the installation of all equipment systems and for the initial charging of each system with chemicals as called for.
2. Complete start-up service to acquaint Owner’s operating personnel with the operation and adjustment of each equipment system, care and handling of treatment chemicals, and water test control procedures.
3. Complete water analysis to be conducted on the owners premises at the time of each service call with a written report of the findings to be left with the owner and a copy of such report to be forwarded to the consulting engineer.

3.6 DEMONSTRATION

A. See Division 01 for project requirements.

END OF SECTION 23 25 00

SECTION 23 31 00 - DUCTWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Duct Materials.
2. Flexible ducts.
3. Insulated flexible ducts.
4. Single wall spiral round ducts.
5. Ductwork fabrication.
6. Duct cleaning.
7. Duct Sealing Mastics.

1.3 REFERENCES

A. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A90 - Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
3. ASTM A568 - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
4. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
5. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
6. ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
2. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems.
3. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

C. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Air Duct Leakage Test Manual.
2. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

D. Underwriters Laboratories Inc.:

1. UL 181 - Factory-Made Air Ducts and Connectors.

1.4 PERFORMANCE REQUIREMENTS

A. Variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is not permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.5 SUBMITTALS

A. See Division 01 for project requirements.

1.6 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and flexible.

B. Construct ductwork to NFPA 90A, NFPA 90B, and NFPA 96 standards.

1.8 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.10 ENVIRONMENTAL REQUIREMENTS

A. See Division 01 for project requirements.

B. Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.

C. Maintain temperatures during and after installation of duct sealant.

1.11 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 DUCT MATERIALS

A. Galvanized Steel Ducts: ASTM A653 galvanized steel sheet, lock-forming quality, having G60 zinc coating of in conformance with ASTM A90.

B. Steel Ducts: ASTM A1008, ASTM A1011, or ASTM A568.

C. Aluminum Ducts: ASTM B209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-T6 or of equivalent strength.

D. Fasteners: Rivets, bolts, or sheet metal screws.

E. Hanger Rod: ASTM A36; steel; threaded both ends, threaded one end, or continuously threaded.

2.2 FLEXIBLE DUCTS

A. Manufacturers:

1. Flex-Master.
2. Therma Flex.
3. Techna Flex.

B. Product Description: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helical-wound spring steel wire.

1. Pressure Rating: 10 inches wg positive and 1.0 inches wg negative.

2. Maximum Velocity: 4000 fpm.
3. Temperature Range: -20 degrees F to 210 degrees F.

2.3 INSULATED FLEXIBLE DUCTS

A. Manufacturers:

1. Flex-Master.
2. Therma Flex.
3. Techna Flex.

B. Product Description: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helical wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.

1. Pressure Rating: 10 inches wg positive and 1.0 inches wg negative.
2. Maximum Velocity: 4000 fpm.
3. Temperature Range: -20 degrees F to 210 degrees F.
4. Thermal Resistance: 4.2 square feet-hour-degree F per BTU.

2.4 SINGLE WALL SPIRAL ROUND DUCTS

A. Product Description: UL 181, Class 1, round spiral lockseam duct constructed of galvanized steel.

B. Duct Coating (corrosive or underground applications only): Polyvinyl chloride plastic, 4 mil thick on outside and 2 mil thick on inside. Temperature range: minus 30 degrees F to 200 degrees F.

C. Construct ductwork and fittings with the following minimum gauges:

Diameter	Gauge	Fitting Gauge
3" to 14"	26	24
15" to 26"	24	22
28" to 36"	22	20
38" to 50"	20	20
52" to 84"	18	16

2.5 SHOP FABRICATED DUCTWORK

A. Fabricate and support rectangular ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible and as indicated on Drawings. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Construct T's, bends, and elbows with minimum radius 1-1/2 times centerline duct width. Where not possible and where rectangular elbows are used, provide airfoil turning vanes. Where acoustical lining is indicated, furnish turning vanes of perforated metal with glass fiber insulation.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

D. Provide standard 45-degree lateral wye takeoffs. When space does not allow 45-degree lateral wye takeoff, use 90-degree conical tee connections.

2.6 CLEANING

A. Scope of Work

1. Contractor to supply all labor, supervision, tools, equipment, materials, cleaning solutions, transportation, and all effort necessary to perform the requirements herein.
2. Work must be scheduled by the Contractor to clean all existing ductwork to be utilized for the new HVAC system after demolition has been completed and before new connections have been made.

a. Cleaning of existing system components to be utilized for new HVAC system shall include all interior surfaces of the facility's air distribution system from the point where the air enters the system to the point where the air is discharged from the system such as return air grilles, return air ducts to the air handling unit (AHU), the interior surfaces of the AHU, coil compartments, condensate drain pans, supply air ducts, fans, fan housing, fan blades, turning vanes, filter housings, coils, supply diffusers, etc.

B. HVAC system component inspections and site preparations

1. HVAC System Component Inspections: Prior to the commencement of any cleaning work, the HVAC system cleaning contractor shall perform a visual inspection of the HVAC system to determine appropriate methods, tools, and equipment required to satisfactorily complete this project. The inspection should include air handling units and representative areas of the HVAC system components and ductwork.
2. Site Evaluation and Preparations: Contractor shall conduct a site evaluation prior to placing bid, and establish a specific, coordinated plan which details how each area of the building will be protected during the project.

2.7 DUCT SEALING MASTICS

A. Manufacturer meeting requirements of SMACNA HVAC Joint Sealing: Refer to SMACNA HVAC Duct Construction Standards, paragraph S1.9.

B. Sealant: Elastomeric compound, gun or brush grade, maximum 25 flame spread and 50 smoke developed (dry state) compounded specifically for sealing ductwork as recommended by the manufacturer. Generally provide liquid sealant, with or without compatible tape, for low clearance slip joints and heavy, permanently elastic, mastic type where clearances are larger. Oil base caulking and glazing compounds are not acceptable because they do not retain elasticity and bond.

C. Gaskets in Flanged Joints: Soft neoprene.

D. Foil tapes shall not be used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

B. Verify sizes of equipment connections before fabricating transitions.

3.2 INSTALLATION

A. Install and seal ducts with duct sealing mastic in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. During construction, install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

C. Use crimp joints with or without bead or beaded sleeve couplings for joining round duct sizes 8 inch and smaller.

D. Install duct hangers and supports in accordance with Section 23 05 29.

E. Use double nuts and lock washers on threaded rod supports.

F. Connect flexible ducts to metal ducts with draw bands.

G. Set plenum doors 6 to 12 inches above floor. Arrange door swing so fan static pressure holds door in closed position.

H. Exposed ductwork: Where ductwork is to be routed exposed, contractor shall de-grease and prime with paint grip finish.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Install openings in ductwork where required to accommodate thermometers and controllers. Install pitot tube openings for testing of systems. Install pitot tube complete with metal can with spring device or screw to prevent air leakage. Where openings are provided in insulated ductwork, install insulation material inside metal ring.

B. Connect diffusers or light troffer boots to low pressure ducts with 5 feet maximum length of flexible duct held in place with strap or clamp.

C. Connect air terminal units and air outlets and inlets to supply ducts with five foot maximum length of flexible duct. Do not use flexible duct to change direction.

3.4 CLEANING

A. See Division 01 for project requirements.

B. Small Systems: Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air flow, clean one half of system completely before proceeding to other half. Protect equipment with potential to be harmed by excessive dirt with temporary filters, or bypass during cleaning.

C. Large Systems: Clean duct systems with high power vacuum machines. Protect equipment with potential to be harmed by excessive dirt with filters, or bypass during cleaning. Install access openings into ductwork for cleaning purposes.

3.5 SCHEDULES

A. Ductwork Material Schedule:

AIR SYSTEM	MATERIAL
Supply	Steel
Return and Relief	Steel
General Exhaust	Steel
Exposed Round Ductwork	Steel (Spiral) with Paint Grip Finish
Intake and Exhaust	Steel

B. Ductwork Pressure Class Schedule:

AIR SYSTEM	PRESSURE CLASS
Constant Volume Supply	1 inch wg
Variable Air Volume Supply (downstream of fan powered boxes)	1 inch wg
Variable Air Volume Supply (upstream of fan powered boxes)	3 inch wg
Return and Relief	1 inch wg.
General Exhaust	1 inch wg

END OF SECTION 23 31 00

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Duct access doors.
2. Volume control dampers.
3. Flexible duct connections.
4. Duct test holes.
5. Dial thermometers.
6. Static pressure gages.

1.3 REFERENCES

A. Air Movement and Control Association International, Inc.:

1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

B. ASTM International:

1. ASTM E1 - Standard Specification for ASTM Thermometers.

C. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
2. NFPA 92A - Recommended Practice for Smoke-Control Systems.

D. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

E. Underwriters Laboratories Inc.:

1. UL 555 - Standard for Safety for Fire Dampers.
2. UL 555C - Standard for Safety for Ceiling Dampers.
3. UL 555S - Standard for Safety for Smoke Dampers.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors, and duct test holes.

C. Product Data: Submit data for shop fabricated assemblies and hardware used.

D. Product Data: Submit for the following. Include where applicable electrical characteristics and connection requirements.

1. Fire dampers including locations and ratings.
2. Smoke dampers including locations and ratings.
3. Backdraft dampers.
4. Flexible duct connections.
5. Volume control dampers.
6. Duct access doors.
7. Duct test holes.

E. Product Data: For fire dampers, smoke dampers, and combination fire and smoke dampers submit the following:

1. Include UL ratings, dynamic ratings, leakage, pressure drop and maximum pressure data.
2. Indicate materials, construction, dimensions, and installation details.
3. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.

F. Manufacturer's Installation Instructions: Submit for Fire and Combination Smoke and Fire Dampers.

G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of access doors and test holes.

C. Operation and Maintenance Data: Submit for Combination Smoke and Fire Dampers.

1.6 QUALITY ASSURANCE

A. Dampers tested, rated and labeled in accordance with the latest UL requirements.

B. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. See Division 01 for project requirements.

B. Protect dampers from damage to operating linkages and blades.

C. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

D. Storage: Store materials in a dry area indoor, protected from damage.

E. Handling: Handle and lift dampers in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.11 COORDINATION

A. See Division 01 for project requirements.

B. Coordinate Work where appropriate with building control Work.

1.12 EXTRA MATERIALS

A. See Division 01 for project requirements.

B. Furnish two of each size and type of fusible link.

PART 2 - PRODUCTS

2.1 DUCT ACCESS DOORS

A. Manufacturers:

1. Ruskin.

2. Cesco Products.
3. Carnes.
4. Vent products.
5. Pottorff.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.

C. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, furnish minimum 1 inch thick insulation with sheet metal cover.

1. Less than 12 inches square, secure with sash locks.
2. Up to 18 inches Square: Furnish two hinges and two sash locks.
3. Up to 24 x 48 inches: Three hinges and two compression latches.
4. Larger Sizes: Furnish additional hinge.
5. Access panels with sheet metal screw fasteners are not acceptable.

2.2 VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Ruskin.
2. Vent Products.
3. Dowco Products.
4. Air Balance Inc.
5. Pottorff.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized frame channel with suitable hardware.

E. End Bearings: Except in round ductwork 12 inches and smaller, furnish end bearings. On multiple blade dampers, furnish oil-impregnated nylon or sintered bronze bearings. Furnish closed end bearings on ducts having pressure classification over 2 inches wg.

F. Quadrants:

1. Furnish locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on standoff mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches furnish regulator at both ends.

G. Remote Operator: Provide Young Regulator 270-896, Roto-Twist, or equal, remote operator where damper access cannot be attained through ceiling access door. Operator to be by cable through 7/18" diameter paintable cold rolled steel coverplate concealing socket wrench operated rack and pinion gear drive. Damper shall be complete with similar gear drive smoothly to operate damper through full range of motion from tight shut-off to wide open.

2.3 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.

B. Connector: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric conforming to NFPA 90A, minimum density 30 oz per sq yd.
2. Net Fabric Width: See detail on drawings.
3. Metal: 3 inch galvanized steel.

C. Leaded Vinyl Sheet: Minimum 0.55 inch thick, 0.87 lbs. per sq ft, 10 dB attenuation in 10 to 10,000 Hz range.

2.4 DUCT TEST HOLES

A. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Furnish extended neck fittings to clear insulation.

2.5 DIAL THERMOMETERS

A. Thermometer: ASTM E1, stainless steel case, bimetallic helix actuated with silicone fluid damping, white with black markings and black pointer hermetically sealed lens, stainless steel stem.

1. Size: 2-1/2 inch diameter dial.
2. Lens: Clear glass.
3. Accuracy: 1 percent.
4. Calibration: Degrees F.

2.6 STATIC PRESSURE GAGES

A. Dial Gages: 3-1/2 inch diameter dial in metal case, diaphragm actuated, black figures on white background, front calibration adjustment, 2 percent of full scale accuracy.

B. Inclined Manometer: Plastic with red liquid on white background with black figures, front calibration adjustment, 3 percent of full scale accuracy.

C. Accessories: Static pressure tips with compression fittings for bulkhead mounting, 1/4 inch diameter tubing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

B. Verify ducts and equipment installation are ready for accessories.

C. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

3.2 INSTALLATION

A. Install in accordance with NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 00 for duct construction and pressure class.

B. Access Doors: Install access doors at the following locations and as indicated on Drawings:

1. Before and after each duct mounted filter.
2. Before and after each duct mounted coil.
3. Before and after each duct mounted fan.
4. Before and after each automatic control damper.
5. Before and after each fire damper.

C. Access Door Sizes: Install minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated on Drawings. Review locations prior to fabrication.

D. Install temporary duct test holes required for testing and balancing purposes. Cut or drill in ducts. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

E. Install permanent duct test holes where indicated on Drawings and required for testing and balancing purposes.

3.3 INSTALLATION - THERMOMETERS

A. Install thermometers in air duct systems on flanges.

B. Where thermometers are provided on local panels, duct mounted thermometers are not required.

C. Locate duct-mounted thermometers minimum 10 feet downstream of mixing-dampers, coils, or other devices causing air turbulence.

D. Install static pressure gages to measure across filters and filter banks, inlet to outlet. On multiple banks, provide manifold and single gage.

E. Provide instruments with scale ranges selected according to service with largest appropriate scale.

F. Install thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

G. Adjust thermometers to final angle, clean windows and lenses, and calibrate to zero.

3.4 DEMONSTRATION

A. See Division 01 for project requirements.

END OF SECTION 23 33 00

SECTION 23 36 00 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Fan powered terminal units.

1.3 REFERENCES

A. American Refrigeration Institute:

1. ARI 880 - Air Terminals.
2. ARI 885 -Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets.

B. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

C. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

D. Underwriters Laboratories Inc.:

1. UL 181 - Factory-Made Air Ducts and Connectors.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Submit data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings indicating airflow, static pressure, hot water heating coil capacity and NC designation. Include electrical characteristics and connection requirements. Include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures of 1 inch to 4 inches wg.

C. Manufacturer's Installation Instructions: Submit support and hanging details, and service clearances required.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of units, controls components.

C. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists. Include directions for resetting constant volume regulators.

1.6 QUALITY ASSURANCE

A. Test and rate air terminal units performance for air pressure drop, flow performance, and acoustical performance in accordance with ARI 880 and ARI 885. Attach ARI seal to each terminal unit.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 COORDINATION

A. See Division 01 for project requirements.

B. Coordinate Work with 23 09 00 - HVAC Instrumentation and Controls.

1.11 WARRANTY

A. See Division 01 for project requirements.

1.12 EXTRA MATERIALS

A. See Division 01 for project requirements.

B. Furnish two additional electric motors of each size of fan powered terminal units.

PART 2 - PRODUCTS

2.1 FAN POWERED VARIABLE VOLUME UNITS

A. Manufacturers:

1. Titus.
2. Trane.
3. Krueger.
4. Price.
5. Nailor.
6. ETI.
7. Carnes
8. Metalaire.
9. Tuttle and Bailey

B. Product Description: Variable air volume terminals for connection to central air systems with electronic controls and hot water heating coils.

C. Identification: Furnish each air terminal unit with identification label and airflow indicator. Include unit nominal airflow, maximum factory-set airflow and minimum factory-set airflow and coil type.

D. Basic Assembly:

1. Casings: Minimum 22 gage galvanized steel.
2. Lining: Minimum 1 inch thick fiber free insulation, 1.5 lb./cu ft density, meeting NFPA 90A requirements and UL 181 erosion requirements.
3. Air Inlets: Round stub connections for duct attachment.
4. Air Outlets: S slip-and-drive connections.

E. Basic Unit:

1. Configuration: Air volume damper assembly inside unit casing. Locate control components inside protective metal shroud.

2. Volume Damper: Construct of galvanized steel with peripheral gasket and self-lubricating bearings; maximum damper leakage: 2 percent of design air flow at 3 inches inlet static pressure.
3. Mount damper operator to position damper normally open.

F. Attenuation Section: Line attenuation sections with 2 inch thick insulation.

G. Controls:

1. The terminals shall be equipped with pressure independent direct digital controls supplied by the control contractor and mounted by the terminal unit manufacturer. Control contractor shall provide data sheets on all components to be mounted, indicating component dimensions, mounting hardware, and methods, as well as wiring and piping diagrams for each application identified by unit tag per the schedule in the drawings, to the terminal manufacturer.
2. Controls shall be compatible with pneumatic inlet velocity sensors supplied by the terminal manufacturer. The sensor shall be multi-point center averaging type, with a minimum of four measuring ports parallel to the take-off point from the sensor. Sensors with measuring ports in series are not acceptable. The sensor must provide a minimum differential pressure signal of 0.03" w.g. at an inlet velocity of 500 fpm.
3. Controls shall be field set by control contractor for the scheduled minimum and maximum flow rates. Flow measuring taps and flow curves will be supplied with each terminal for field balancing airflow. All pneumatic tubing shall be UL listed fire retardant (FR) type. Each terminal shall be equipped with labeling showing unit location, size and scheduled cfm.
4. The terminal manufacturer shall provide a disconnect switch and terminals suitable for connection of 24V. power by T.C. contractor. Actuator shall be direct connection shaft mount type without linkage. All controls shall be installed in approved NEMA type sheet metal enclosure by terminal manufacturer.

H. Automatic Damper Operator:

1. Electric Actuator: Furnished by the Building Automation System contractor to the box manufacturer for mounting in the factory.
2. Velocity Reset Controller and Probe:

    a. Calibration pressure taps for pressure independent control to compensate for varying inlet static pressure.
    b. Minimum and maximum limits set at reset device.
    c. Maintain air flow to within 5 percent of set point with inlet static pressure variations up to 4 inches.
    d. Reset span shall remain constant regardless of minimum or maximum setting. Reset start point shall be adjustable.

I. Fan Assembly:

1. Fan: Forward curved centrifugal type with direct drive permanent-split-capacitor type, thermally protected motor.
2. Speed Control: Infinitely adjustable with electric/pneumatic and electronic controls.
3. Isolation: Fan/motor assembly on rubber isolators.
4. Electrical Characteristics: See Schedule.

J. Hot Water Heating Coil:

1. Construction: 1/2 inch copper tube mechanically expanded into aluminum plate fins, leak tested under water to 200 psig pressure, factory installed.
2. Capacity: Based on scheduled entering water and leaving air temperature and 100 percent total air volume with mixed air temperature scheduled.

K. Wiring:

1. Factory mount and wire controls. Mount electrical components in control box with removable cover. Incorporate single point electrical connection to power source.
2. Factory mount transformer for control voltage on electric and electronic control units. Furnish terminal strip in control box for field wiring of thermostat and power source.
3. Electrical Characteristics: See Schedule.
4. Wiring Terminations: Wire fan and controls to terminal strip. Furnish terminal lugs to match branch-circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box.
5. Disconnect Switch: Factory mount non-fused disconnect switch in control panel.

L. Sound Ratings: Not to exceed scheduled values at scheduled static pressure.

M. Controls: Electronic Controls: Contain in NEMA 250 Type 1 enclosure with access panel sealed from airflow and mounted on side of unit. Factory mount controls.

N. Thermostat: Refer to Section 23 09 00.

O. Sequence of Operation: Refer to Section 23 09 93.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

B. Verify ductwork is ready for air terminal installation.

3.2 INSTALLATION

A. Connect to ductwork in accordance with Section 23 31 00.

B. Install ceiling access doors or locate units above easily removable ceiling components.

C. Support units individually from structure. Do not support from adjacent ductwork.

D. Support air terminal units connected by flexible duct independently of flexible duct.

E. Install transition piece to match flexible duct size to inlet or outlet of variable air volume terminal.

3.3 ADJUSTING

A. See Division 01 for project requirements.

B. Reset volume with damper operator attached to assembly allowing flow range modulation from 100 percent of design flow to scheduled percent full flow.

END OF SECTION 23 36 00

SECTION 23 37 00 - AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Diffusers.
2. Registers.
3. Grilles.

1.3 REFERENCES

A. Air Movement and Control Association International, Inc.:

1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets.

C. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Submit sizes, finish, and type of mounting. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

C. Test Reports: Rating of air outlet and inlet performance.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of air outlets and inlets.

1.6 QUALITY ASSURANCE

A. Test and rate diffuser, register, and grille performance in accordance with ASHRAE 70.

B. Test and rate louver performance in accordance with AMCA 500.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.9 WARRANTY

A. See Division 01 for project requirements.

1.10 EXTRA MATERIALS

A. See Division 01 for project requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS (unless otherwise noted)

A. Titus.

B. Raymon-Donco.

C. Krueger.

D. Carnes.

E. Metal-Aire.

F. Price.

G. Nailor.

H. Tuttle and Bailey.

I. American Louver.

J. Anemostat.

2.2 PLAQUE CEILING DIFFUSERS - (Tag “ A ”)

A. Basis of Design: Titus model Omni.

B. Type: Square, plaque, air deflector to discharge air in 360 degree pattern.

C. Frame: To match ceiling type.

D. Fabrication: Steel with baked enamel finish as selected by Architect.

E. Accessories: Radial opposed blade damper.

2.3 CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES - (Tag " B ")

A. Basis of design: Titus model 50F.

B. Type: Fixed grilles of 1/2 x 1/2 x 1inch grid or ½ x ½ x ½ inch grid with 45 degree deflection.

C. Fabrication: Aluminum with factory baked enamel finish of color selected by architect.

D. Frame: 1 inch margin with countersunk screw mounting for surface mounting or Channel lay-in frame for suspended grid ceilings.

E. Backpan: Back pan shall be painted flat black in the factory or in the field prior to installation.

F. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face where manual volume damper is not shown on plans.

2.4 STEEL EXHAUST AND RETURN REGISTERS/GRILLES - (Tag " C ")

A. Basis of design: Titus model 350R

B. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 35 degrees.

C. Frame: 1 inch margin with countersunk screw mounting.

D. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades with factory baked enamel finish of color selected by architect.

E. Orientation: Front bars shall be parallel to floor when in wall, parallel to long dimension when in ceiling.

F. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where manual volume damper is not shown on plans.

2.5 ALUMINUM SUPPLY REGISTERS/GRILLES - (Tag " D ")

A. Basis of design: Titus model 300F

B. Type: Streamlined, 3/4 inch minimum depth, 3/4 inch maximum spacing, and individually adjustable curved blades to discharge air along face of grille, two-way deflection.

C. Frame: 1 inch margin with countersunk screw mounting and gasket.

D. Fabrication: Minimum 20 gauge aluminum frame and 22 gauge steel aluminum bars with factory baked enamel finish of color selected by architect.

E. Orientation: Front bars shall be parallel to floor when in wall, parallel to long dimension when in ceiling.

F. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face where manual volume damper is not shown on plans.

2.6 PLENUM SLOT DIFFUSERS - (Tag " E ")

A. Basis of Design: Titus model TBDI-80.

B. Type: Continuous with adjustable vanes for left, right, or vertical discharge.

C. Fabrication: Steel with factory off-white enamel finish.

D. Frame: 1-1/4 inch margin with support clips for T bar mounting and gasket, mitered end border and end cap, center notch where required by ceiling grid.

E. Plenum: Integral, galvanized steel, insulated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify inlet and outlet locations.

C. Verify ceiling and wall systems are ready for installation.

3.2 INSTALLATION

A. Install diffusers to ductwork with airtight connection.

B. Install balancing dampers on duct take-off to diffusers, grilles, and registers, whether or not dampers are furnished as part of diffuser, grille, and register assembly. Refer to Section 23 33 00.

C. Paint visible portion of ductwork behind air outlets and inlets matte black. Refer to Section 09 90 00.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

END OF SECTION 23 37 00

SECTION 23 81 23 - PRE-PURCHASED COMPUTER-ROOM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 PRE-PURCHASED EQUIPMENT

A. Due to unknown variables on equipment costs, lead time, and availability in the future, the owner has elected to pre-bid and purchase the equipment called for in this section of the specifications.

B. Equipment has been shipped to the project site and is in storage in a location as directed per owner. Equipment will be unloaded by the installing contractor.

C. The equipment manufacturer's bid shall include installation of equipment (including all required piping, insulation, tubing, wiring, controls, etc.), equipment controls and integration into existing BAS, coordination of power devices and connections with electrical contractor, start-up services, and warranty for labor on equipment.

1.3 WORK INCLUDED

A. The installing contractor shall check all equipment prior to acceptance. If the installing contractor finds any damage to equipment or missing parts, they shall notify Owner and Architect/Engineer in writing immediately.

B. The installing contractor will provide all materials and labor to unload, store, transport, and completely install the equipment.

C. The installing contractor shall notify the equipment manufacturer when the equipment is to be installed and arrange for equipment manufacturer's personnel to be at site for check out and start-up of the equipment.

D. Furnish and install all wiring and piping connections to equipment. Power for equipment shall be coordinated with electrical contractor.

1.4 SUMMARY

A. Section Includes:

1. Condensing units.
2. Indoor Units.
3. Controls.

B. Related Sections:

1. Section 23 09 93 - Sequence of Operations for HVAC Controls: Sequences of operation applying to units in this section.

2. Section 23 23 00 - Refrigerant Piping: Execution requirements for connection to refrigerant piping specified by this section.
3. Section 26 05 03 - Equipment Wiring Connections: Electrical connection to units.

1.5 REFERENCES

A. Air-Conditioning and Refrigeration Institute:

1. ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
2. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
3. ARI 340/360 - Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment.
4. ARI 365 - Commercial and Industrial Unitary Air-Conditioning Condensing Units.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
2. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.

C. ASTM International:

1. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

D. National Electrical Manufacturers Association:

1. NEMA MG 1 - Motors and Generators.

E. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. All pre-purchased equipment submittals will be furnished to Architect/Engineer for review by the equipment manufacturer. After submittals have been reviewed by Architect/Engineer, equipment manufacturer will transmit reviewed and corrected submittals to contractor for his use in the installation of the equipment.

C. Product Data: Submit data indicating:

1. Cooling and heating capacities.
2. Dimensions.
3. Weights.
4. Rough-in connections and connection requirements.
5. Duct connections.

6. Electrical requirements with electrical characteristics and connection requirements.
7. Controls.
8. Accessories.

D. Manufacturer's Installation Instructions: Submit assembly, support details, connection requirements, and include start-up instructions.

E. Manufacturer’s Field Reports: Submit start-up report for entire system.

1.7 SUBMITTALS AT PROJECT CLOSEOUT

A. See Division 01 for project requirements.

B. Project Record Documents: Record actual locations of controls installed remotely from units.

C. Operation and Maintenance Data: All operations and maintenance data for equipment will be furnished to owner by pre-purchased equipment manufacturer.

D. Filled out equipment warranty information including equipment model, serial, contact information, start-up date, and warranty period.

1.8 QUALITY ASSURANCE

A. Performance Requirements: Energy Efficiency Rating (EER) not less than prescribed by ASHRAE 90.1 when used in combination with compressors and evaporator coils when tested in accordance with ARI 210/240 or ARI 340/360.

B. Cooling Capacity: Rate in accordance with ARI 210/240, ARI 340/360, or ARI 365.

C. Sound Rating: Measure in accordance with ARI 270.

D. Insulation and adhesives: Meet requirements of NFPA 90A.

1.9 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.10 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Equipment manufacturer shall coordinate and deliver equipment to the project site, or storage facility as directed per owner. Contractor shall be responsible to move the pre-purchased equipment from the owners storage area to the area of construction for installation of the equipment.

C. Contractor shall inspect equipment and accessories for damage. Contractor shall offload equipment and facilitate the proper storage and protection for products to site under provisions of Section 016000. Comply with manufacturer's installation instruction for rigging, unloading and transporting units.

D. Protect units from weather and construction traffic by storing in dry, roofed location.

1.12 COORDINATION

A. Section 01 31 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate installation of condensing units with roof structure.

1.13 WARRANTY

A. See Division 01 for project requirements.

B. Provide the following warranty on the pre-purchased equipment:

1. Equipment Manufacturer shall provide 5-year parts warranty for compressors.
2. Contractor shall provide 5-year labor warranty for compressors.

1.14 MAINTENANCE SERVICE

A. Section 01 77 00 - Execution and Closeout Requirements: Requirements for maintenance service.

B. Furnish service and maintenance of equipment for one year from Date of Substantial Completion. Include maintenance items as shown in manufacturer's operating and maintenance data, including filter replacements and controls checkout and adjustments.

1.15 MAINTENANCE MATERIALS

A. See Division 01 for project requirements.

PART 2 - PRE-PURCHASED PRODUCTS

A. Acceptable Manufacturers

1. Basis of Design: Liebert.

B. Control System: Electro-mechanical controls for BAS interface.

C. Electrical: All electrical components including capacitors, relays, and control transformers are pre-wired. Each unit is provided with a microswitch to prevent condensate pan overflow. The microswitch will disable the unit prior to pan overflow should the drain line become plugged with debris.

D. Electric Reheat: Electric reheat is accomplished with low watt, low density finned tube fabricated of stainless steel core sheath with plated fins to withstand moist conditions. Reheat is installed on the air discharge side of the cooling coil and provides ample capacity to maintain room drybulb conditions during dehumidification. Low-watt density coils eliminate ionization associated with open air electric resistance heating.

E. Cabinet: Mini-Plus indoor sections are constructed with tubular steel frames for strength and service access. Removable galvanized steel panels are lined with 1 inch thick, 1-1/2 pound density insulation for quiet and efficient operation. An integral filter section with 2" filters is standard.

F. Outdoor Condensing Unit:

1. Evaporator Section – The evaporator section is a draw-through type with double width, double inlet blower with belt drive and variable pitch sheave. The self-aligning ball bearings are rated for a minimum life of 100,000 hours. The evaporator coil is constructed of copper tubes and aluminum fins. The single stage refrigeration circuit includes an expansion valve with external equalization. A stainless steel drain pan is standard. Field supplied return and supply air ductwork is required for all Mini-Plus evaporator section.
2. Outdoor Condensing Unit – The condensing unit contains a scroll compressor with crankcase heater, filter drier, sight glass, and condenser coil. The condenser coil is constructed with copper tubes and aluminum fins. The galvanized steel housing and fan guard powder coated for longer life. The energy efficient condenser fan is thermally protected. Air discharge is vertical. The condenser fan is variable speed for head pressure control to -20° F ambient conditions. Field piping and wiring is required between the indoor evaporator section and the outdoor condensing unit.
3. Evaporator/Compressor Section The evaporator section is a draw through type with double width, double inlet blower with belt drive and variable pitch sheave. The self-aligning ball bearings are rated for a minimum life of 100,000 hours. The evaporator coil is constructed of copper tubes and aluminum fins. The expansion valve with external equalization is contained in the evaporator section. A stainless steel drain pan is standard.
4. The compressor section is contained in a “side car” and attached to the evaporator section and includes a scroll compressor with crankcase heater, filter drier and sight glass. Field supplied return and supply air ductwork is required for all Mini-Plus evaporator sections.

5. Outdoor Condenser Section The outdoor condenser includes a condenser coil, integral factory wired panel and condenser fan motor. The condenser coil is constructed of copper tubes and aluminum fins. The thermally protected fan motor is variable speed for head pressure control to -20° F ambient conditions. The galvanized steel housing is powder coated for longer life. Field piping and wiring is required between the indoor evaporator/compressor and the condenser sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 31 00 - Administrative Requirements: Verification of existing conditions before starting work.

3.2 INSTALLATION - AIR HANDLING UNIT

A. Connect indoor units to supply and return ductwork with flexible connections. Refer to Section 23 33 00.

B. Install condensate piping with trap and route from drain pan as shown on drawings.

C. Install moisture/water detectors as shown on drawings.

D. Install components furnished loose for field mounting.

E. Install connection to electrical power wiring in accordance with Section 26 05 03.

F. Coordinate installation of controls to integrate equipment into existing BAS.

3.3 INSTALLATION - CONDENSING UNIT

A. Install condensing units on vibration isolators.

B. Install units on full perimeter roof curbs.

C. Install refrigerant piping from unit to condensing unit. Install refrigerant specialties furnished with unit.

D. Evacuate refrigerant piping and install initial charge of refrigerant.

E. Install electrical devices furnished loose for field mounting.

F. Install control wiring between indoor units, condensing unit, and field installed accessories.

G. Install connection to electrical power wiring in accordance with Section 26 05 03.

3.4 MANUFACTURER'S FIELD SERVICES

A. Section 01 40 00 - Quality Requirements: Requirements for manufacturer’s field services.

B. Furnish initial start-up and shutdown during first year of operation, including routine servicing and checkout.

3.5 CLEANING

A. Section 01 77 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Vacuum clean coils and inside of unit cabinet.

C. Install new throwaway filters in units at Substantial Completion.

3.6 DEMONSTRATION

A. Section 01 77 00 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Engage manufacturer or factory-authorized service representative to train owner's maintenance personnel to adjust, operate and maintain individual units and complete system.

C. Demonstrate starting, maintenance, and operation of condensing unit.

3.7 PROTECTION OF FINISHED WORK

A. Section 01 77 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Do not operate system until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION 23 81 23

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Grounding electrodes and conductors.
2. Equipment grounding conductors.
3. Bonding methods and materials.
4. Conduit and equipment supports.
5. Anchors and fasteners.
6. Nameplates and labels.
7. Wire markers.
8. Raceway markers.
9. Underground warning tape.
10. Sealing and fireproofing of sleeves and openings between conduits, wireways, boxes and troughs.

1.3 REFERENCES

A. NECA (National Electrical Contractors Association) - Standard of Installation.

B. NETA ATS (International Electrical Testing Association) - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.4 SYSTEM DESCRIPTION

A. Grounding systems use the following elements as grounding electrodes:

1. Metal underground water pipe.
2. Metal building frame.
3. Concrete-encased electrode.
4. Ground ring.
5. Rod electrode.

B. Anchor and fasten electrical products to building elements and finishes as follows:

1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors and preset inserts.
2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset fasteners, and welded fasteners.
3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
5. Solid Masonry Walls: Provide expansion anchors and preset inserts.

6. Sheet Metal: Provide sheet metal screws.
7. Wood Elements: Provide wood screws.

C. Identify electrical components as follows:

1. Nameplate for each electrical distribution and control equipment enclosure.
2. Wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes and each load connection.
3. Underground warning tape along length of each underground raceway or cable.

1.5 DESIGN REQUIREMENTS

A. Select materials, sizes, and types of anchors, fasteners, and supports to carry loads of equipment and raceway, including weight of wire and cable in raceway.

1.6 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 25 ohms or less.

1.7 SUBMITTALS FOR REVIEW

A. Coordination Shop Drawings: Provide 1/8" = 1'-0" scale drawings indicating location and elevation of all conduits 2" and larger, both above and below grade, pull boxes, panelboards, grounding electrodes, etc., prior to fabrication or installation of any work. Drawings shall also be submitted electronically in AutoCAD to ventilation contractor who will create "overlay" drawings indicating locations and elevations of work of all trades in different colors for final coordination and sign-off by all trades.

1.8 CLOSEOUT SUBMITTALS

A. Project Record Documents: Provide updated version of 1/8" = 1'-0" scale coordination shop drawings indicating actual locations of items shown on the original drawings. Drawings shall include all revisions incorporated throughout th project. Drawings shall include updated plans views, circuiting, risers, panel schedules and routing of all feeders. Plans shall be submitted in PDF and created utilizing software packages such as AutoCAD or Adobe. Record documents produced utilizing hand markups will not be acceptable.

B. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.10 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.11 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES

A. Material: Copper-clad steel.

B. Diameter: 3/4 inch or larger.

C. Length: 10'-0" or longer.

2.2 MECHANICAL CONNECTORS

A. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.3 EXOTHERMIC CONNECTIONS

A. Manufacturers:

1. Erico, Inc.
2. Harger Lightning Protection.
3. Thomas & Betts Corp.

B. Product Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

2.4 WIRE

A. Material: Stranded copper.

B. Foundation Electrodes: 4 AWG. or larger.

C. Grounding Electrode Conductor.

2.5 ANCHORS AND FASTENERS

A. Anchors and Fasteners: Compatible with application.

B. Materials and Finishes: Corrosion resistant.

2.6 FORMED STEEL CHANNEL

A. Manufacturers:

1. Cooper B-Line.
2. Unistrut.
3. Superstrut.

B. Description: Galvanized steel.

2.7 SPRING STEEL CLIPS

A. Manufacturers:

1. Cooper B-Line.
2. Erico, Inc.
3. Thomas & Betts Corp.

2.8 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

B. Letter Size:

1. 1/4" letters for identifying individual equipment and loads.

C. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background.

2.9 WIRE MARKERS

A. Description: Cloth tape , split sleeve , or tubing type wire markers.

B. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number as indicated on Drawings.
2. Control Circuits: Control wire number as indicated on shop drawings, schematic and interconnection diagrams.

2.10 UNDERGROUND WARNING TAPE

A. Description: 4 inch wide plastic tape, colored red or yellow with suitable warning legend describing buried electrical lines.

2.11 SEALING AND FIREPROOFING

A. Fire and Smoke Rated Surfaces:

1. Manufacturers:

a. 3M CP 25N/S or CP25S/L caulk.
b. 3M FS 195 wrap or strip with restricting collar.
c. 3M CS 195 composite sheet.
d. 3M Fire Barrier Moldable Putty Pads MPP+.
e. Pipe Shield, Inc. series F fire barrier kits.
f. Proset Systems fire rated floor and wall penetrations.
g. Insta-Foam Products Insta-Fire Seal Firestop Foam.
h. Dow Corning Fire Stop System.
i. Substitutions: Under provisions of Section 01 60 00.

B. General:

1. Furnish UL listed products or products tested by independent testing laboratory.
2. Select products with rating not less than rating of wall or floor being penetrated.

C. Non-Rated Surfaces:

1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.
3. For interior wall or floor openings, furnish one of the following to effect seal:

a. Tremco Dymonic.
b. Sika Corp. Sikaflex la.
c. Sonneborn Sonolastic NPI.
d. Mameco Vilken 116 urethane caulk.
e. ATS acoustical Putty Pads for Junction Boxes.
f. Substitutions: Under provisions of Section 01 60 00.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify final backfill and compaction has been completed before driving rod electrodes.

B. Verify abandoned wiring and equipment serve only abandoned facilities.

3.2 INSTALLATION

A. Grounding and Bonding Installation:

1. Install rod electrodes at required locations. Install additional rod electrodes to achieve specified resistance to ground.
2. Install bonding meeting Regulatory Requirements.
3. Provide service grounding electrode from service to street side service entrance location of main water pipe. Provide jumper around water meter.
4. Provide grounding electrode connection to the metal frame of the building, where effectively grounded.

5. Provide and electrode encased by at least 2 inches of concrete, located within and near the bottom of a concrete foundation or footing that is in direct contact with the earth, consisting of at least 20 feet of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than copper conductor not smaller than No. 4.
6. Provide a ground ring encircling the building or structure, in direct contact with the earth at a depth below earth surface not less than 2 1/2 feet, consisting of at least 20 feet of bare copper conductor not smaller than No. 2.
7. Bond together metal siding not attached to grounded structure; bond to ground.
8. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
9. Locate and install anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
10. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
11. Do not use spring steel clips and clamps.
12. Obtain permission from Architect/Engineer before using powder-actuated anchors.
13. Obtain permission from Architect/Engineer before drilling or cutting structural members.

B. Supports:

1. Fabricate supports from structural steel or formed steel members. Rigidly weld members or install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
2. Install surface mounted cabinets and panelboards with minimum of four anchors.
3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.
4. Install sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

C. Identification Components:

1. Degrease and clean surfaces to receive nameplates and labels.
2. Install nameplate and label parallel to equipment lines.
3. Secure nameplate to equipment front using screws , rivets , or adhesive.
4. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
5. Identify underground conduits using one underground warning tape for each trench at 4 inches below finished grade.

D. Coordination With Other Trades:

1. Contractor shall coordinate the installation of their work with all other contractors of the project.
2. Install all work provided by this contract to maintain installation, maintenance, operation and working clearances of all equipment, including equipment provided by other trades.
3. Install all work provided by this contract to maintain installation, maintenance, operation and working clearances of all existing equipment, including existing equipment of other trades.

E. Box Painting: Identify fire alarm system junction, pull and backboxes with paint, red in color.

F. Panelboard Schedules:

1. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
2. Provide typed circuit directory for each existing panelboard modified under contract. New directory shall include all existing loads previously documented in existing directory and new loads. Identify any breakers in existing panels that do not have load conductors terminated at their lugs and mark as spare. Leave spare breakers in the off position.
3. All panelboard schedules shall list the date created and the size and location (source panel and room) of the upstream over current protection for the feeder serving the panel.

3.3 SEALING AND FIREPROOFING

A. Fire Rated Surface:

1. Seal opening at floor, wall, partition, ceiling, and roof as follows:

   a. Install 12 gage steel sleeve through opening and extending beyond minimum of 1 inch on each side of building element.
   b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
   c. Pack void with backing material.
   d. Seal ends of sleeve with UL listed fire resistive silicone compound to meet fire rating of structure penetrated.

2. Where conduit or other type of electrical raceway, bus or enclosure penetrates fire rated surface, install firestopping product in accordance with manufacturer's published instructions.
3. Utilize suitable and listed materials and methods to maintain fire and smoke resistive rating of all partitions. Penetration and boxes shall be installed and fire sealed to maintain listed partition ratings.

B. Non-Rated Surfaces:

1. Seal opening through non-fire rated wall, floor, ceiling, and roof opening as follows:

   a. Install 12 gage steel sleeve through opening and extending beyond minimum of 1 inch on each side of building element.
   b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
   c. Install type of firestopping material recommended by manufacturer.

2. Install escutcheons floor plates or ceiling plates where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
3. Exterior wall openings below grade: Assemble rubber links of mechanical seal to size of conduit and tighten in place, in accordance with manufacturer's instructions.
4. Interior partitions: Seal pipe penetrations at computer rooms, telecommunication rooms and data rooms. Apply sealant to both sides of penetration to completely fill annular space between sleeve and conduit.
5. In acoustical partitions, install pads and sealant to maintain acoustical ratings.

C. Sleeves:

1. Sleeves shall be provided for all cable penetrations though partitions for any and all systems. Where sleeve size is not specified on the plans, sleeves shall be provided such that no sleeve is filled beyond 40%. Seal sleeve after completion of cable pulls. Minimum size sleeve shall be 3/4" EMT.

3.4 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

END OF SECTION 26 05 00

SECTION 26 05 05 - SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Removal of existing electrical equipment, wiring, and conduit in areas to be remodeled; removal of designated construction; dismantling, cutting and alterations for completion of the Work.

1. Disposal of materials.
2. Storage of removed materials.
3. Identification of utilities.
4. Salvaged items.
5. Protection of items to remain as indicated on Drawings.
6. Relocate existing equipment to accommodate construction.

1.3 SCHEDULING

A. Schedule work to coincide with renovation schedule.

B. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

1.4 COORDINATION

A. Conduct demolition to minimize interference with adjacent building areas.

B. Coordinate demolition work with general contractor and other trades.

C. Coordinate and sequence demolition so as not to cause shutdown of operation of surrounding areas.

D. Shut-down Periods:

1. Arrange timing of shut-down periods of in service panels with Owner. Do not shut down any utility without prior written approval.
2. Keep shut-down period to minimum or use intermittent period as directed by Owner.
3. Maintain life-safety systems in full operation in occupied facilities, or provide notice minimum one week in advance.
4. Provide temporary power and wiring as required to maintain life-safety and other systems in operation in areas of building not affected by scope of work.
5. Identify salvage items in cooperation with Owner.

1.5 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify wiring and equipment indicated to be demolished serve only abandoned facilities.

C. Verify termination points for demolished services.

3.2 PREPARATION

A. Erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, Owner, Contractor's employees, and existing improvements to remain.

B. Temporary egress signage and emergency lighting

3.3 DEMOLITION

A. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.

B. Remove exposed abandoned conduit including abandoned conduit above accessible ceiling finishes. Cut embedded conduit flush with walls, floors, and patch surfaces.

C. Remove conduit, wire, boxes, and fastening devices to avoid any interference with new installation.

D. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

E. Reconnect equipment being disturbed by renovation work and required for continue service to previous source if remaining or nearest available panel.

F. Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, and related switches, outlets, conduit and wiring which are not part of final project.

G. Install temporary wiring and connections to maintain existing systems in service during construction.

H. Perform work on energized equipment or circuits with experienced and trained personnel utilizing appropriate PPE (Personal Protective Equipment).

I. Remove, relocate, and extend existing installations to accommodate new construction.

J. Repair adjacent construction and finishes damaged during demolition and extension work.

K. Remove exposed abandoned grounding and bonding components, fasteners and supports, and electrical identification components, including abandoned components above accessible ceiling finish. Cut embedded support elements flush with walls and floors.

L. Clean and repair existing equipment to remain or to be reinstalled.

M. Protect and retain power to existing active equipment remaining.

N. Where demolition of a device or electrical equipment is called out for, remove equipment, associated wiring, accessible conduit and auxiliary devices unless otherwise amended by drawing notes or other specification sections.

O. Fluorescent Lamps and Ballasts shall be removed from demolished fixtures and disposed of in compliance with State and Federal EPA standards. Lamps shall be collected and compacted on site utilizing a crushing machine that contains all lamp waste. Lamps shall be recycled, provide Certificate of Recycling proving lamps have been recycled. Ballasts shall be recycled, provide Certificate of Recycling proving ballasts have been recycled.

3.4 EXISTING PANELBOARDS

A. Ring out circuits in existing panel affected by the Work. Where additional circuits are needed, reuse circuits available for reuse. Install new breakers.

B. Tag unused circuits as spare. Leave breakers in off position.

C. Where existing circuits are indicated to be reused, use sensing measuring devices to verify circuits feeding Project area or are not in use.

D. Remove existing wire no longer in use from panel to equipment.

E. Provide new updated directories where any circuits have been modified or rewired.

3.5 SALVAGE ITEMS

A. Remove and protect items indicated on Drawings to be salvaged and turn over to Owner.

B. Items of salvageable value may be removed as work progresses. Transport salvaged items from site as they are removed to location as directed by Owner.

3.6 REUSABLE ELECTRICAL EQUIPMENT

A. Carefully remove equipment, materials, or fixtures which are to be reused.

B. Disconnect, remove, or relocate existing electrical material and equipment interfering with new installation of any systems included in the project.

C. Relocate existing lighting fixtures as indicated on Drawings. Clean fixtures and re-lamp. Test fixture to see if it is in good working condition before installation at new location.

3.7 CLEANING

A. Remove demolished materials as work progresses. Legally dispose.

B. Keep workplace neat.

3.8 PROTECTION OF FINISHED WORK

A. Do not permit traffic over unprotected floor surface.

B. Coordinate floor protection with General Contractor or Construction Manager.

END OF SECTION 26 05 05

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Building Wire and Cable.
2. Wiring Connectors and Connections.

1.3 REFERENCES

A. NECA Standard of Installation (National Electrical Contractors Association).

B. NETA ATS (International Electrical Testing Association) - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

C. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Submit for building wire and cable type.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of components and circuits.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years experience.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 PROJECT CONDITIONS

A. Verify that field measurements are as indicated.

B. Conductor sizes are based on copper.

C. Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 ft of length shown.

1.9 COORDINATION

A. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

A. Manufacturers:

1. Allied Wire & Cable.
2. Encore Wire.
3. Cerro Wire and Cable.
4. Southwire.
5. Republic Wire.

B. Description: Single conductor insulated wire.

C. Conductor: Copper.

D. Insulation Voltage Rating: 600 volts.

E. Insulation: NFPA 70, Type THHN/THWN-2 or XHHW-2 for service-entrance conductors, feeders and branch circuits.

2.2 WIRING CONNECTORS

A. Provide connectors specifically designed for the conductor sizes utilized.

B. When splicing or connecting dissimilar metal conductors (copper to aluminum) use only UL listed, labeled and identified materials and methods.

C. All terminals and splicing shall be in accordance with NEC Section 110-14.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that interior of building has been protected from weather.

C. Verify that mechanical work likely to damage wire and cable has been completed.

D. Verify that raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire and cable.

3.3 INSTALLATION

A. Route wire and cable as required to meet Project Conditions.

B. Install cable in accordance with the NECA "Standard of Installation."

C. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

D. Use stranded conductors for control circuits.

E. Use conductor not smaller than 12 AWG for power and lighting circuits.

F. Use conductor not smaller than 18 AWG for control circuits.

G. Branch circuit wiring for 20 Amp circuits shall be adjusted for voltage drop:

1. 208/120V:
   a. 0-75 - #12 AWG Minimum
   b. 75'-150' - #10 AWG Minimum
   c. 150'-225' - #8 AWG Minimum

2. 480/277V:
   a. 0-100' - #12AWG Minimum
   b. 100'-200' - #10AWG Minimum
   c. 200'-300' - #8AWG Minimum

H. Pull all conductors into raceway at same time.

I. Use suitable wire pulling lubricant for building wire 4 AWG and larger unless pre-lubricated.

J. Protect exposed cable from damage.

K. Support cables above accessible ceiling, using bridal rings. Do not rest cable on ceiling panels.

L. Use UL listed and labeled cable fittings and connectors.

M. Neatly train and lace wiring inside boxes, equipment, switchboards and panelboard enclosures.

N. Clean conductor surfaces before installing lugs and connectors.

O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

P. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

Q. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG.

R. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

S. Identify and color code wire and cable under provisions of Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.

T. All terminations, splices and taps shall be torqued in accordance with manufacturer's recommendations. In the absence of connector or equipment manufacturer's recommended torque values, use UL Standard 486A-B or NFPA70- Informative Annex I.

3.4 FIELD QUALITY CONTROL

A. Inspect and test prior to starting system.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Rod Electrodes.
2. Wire.
3. Mechanical Connectors.
4. Exothermic Connections.

1.3 REFERENCES

A. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.

B. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.

C. NETA ATS (International Electrical Testing Association) - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

D. NFPA 70 - National Electrical Code.

1.4 GROUNDING SYSTEM DESCRIPTION

A. Grounding systems use the following elements as grounding electrodes.

1. Metal underground water pipe.
2. Metal building frame.
3. Concrete-encased electrode.
4. Ground ring.
5. Ground rod.
6. Plate electrode.

1.5 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 25 ohms or less. Capable of achieving 0.1 ohms or less at the sound system master technical, ground bus. The main utility ground electrode system may need to be augmented by supplementary ground electrode(s) to achieve this low resistance to ground.

B. Ground and bond entire electrical system in compliance with the National Electric Code.

1.6 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 QUALITY ASSURANCE

A. Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.

1.8 COORDINATION

A. Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES

A. Manufacturers:

1. Erico Inc.
2. Cadweld.
3. Harger Lightning Protection.
4. ILSCO.
5. Thomas & Betts Corp.

B. Product Description:

1. Material: Copper-clad steel.
2. Diameter: 3/4 inch.
3. Length: 10 feet.

2.2 WIRE

A. Material: Stranded copper.

B. Foundation Electrodes: 4 AWG.

C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements unless indicated larger.

2.3 MECHANICAL CONNECTORS

A. Manufacturers:

1. Erico Inc.
2. Cadweld.
3. Harger Lightning Protection.
4. ILSCO.
5. Thomas & Betts Corp.

B. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.4 EXOTHERMIC CONNECTIONS

A. Manufacturers:

1. Erico Inc.
2. Cadweld.
3. Harger Lightning Protection.
4. ILSCO.
5. Thomas & Betts Corp.

B. Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION

A. Remove paint, rust, mill oils, surface contaminants at connection points.

3.3 EXISTING WORK

A. Verify that existing grounding system is effectively grounded.

B. Modify existing grounding system to maintain continuity to accommodate renovations.

C. Extend existing grounding system using material and methods compatible with existing electrical installations, or as specified.

3.4 INSTALLATION

A. Install in accordance with IEEE.

B. Install rod electrodes at locations as indicated on Drawings. Install additional rod electrodes to achieve specified resistance to ground.

C. Install grounding and bonding conductors concealed from view.

D. Install 4 AWG bare copper wire in foundation footing where available.

E. Bond together reinforcing steel and metal accessories in pool structures.

F. Install branch circuits feeding isolated ground receptacles with separate insulated grounding conductor, connected only at isolated ground receptacle, ground terminals, and at ground bus of serving panel.

G. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

H. Equipment Grounding Conductor. At any junction box or enclosure where a splice or connection is made to the current carrying conductors within the box, provide a bond between the Equipment Grounding Conductor and the metal junction box.

I. Provide service grounding electrode from service to street side service entrance location of main water pipe. Provide jumper around water meter.

J. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

K. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards with installed number 12 conductor to grounding bus.

L. Grounding electrical system using continuous metal raceway system enclosing circuit conductors in accordance with NEC.

M. Permanently attach equipment and grounding conductors prior to energizing equipment.

3.5 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground resistance testing in accordance with IEEE 142.

D. Perform leakage current tests in accordance with NFPA 99.

E. Perform continuity testing in accordance with IEEE 142.

F. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION 26 05 26

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Conduit and equipment supports.
2. Anchors and fasteners.
3. Roof Mounted Conduit Supports

1.3 REFERENCES

A. NECA - National Electrical Contractors Association.

B. NFPA 70 - National Electrical Code.

1.4 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.5 SUBMITTALS

A. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.

B. Product Data:

1. Hangers and Supports: Manufacturers' catalog data including load capacity.

C. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.

D. Manufacturer's Installation Instructions:

1. Hangers and Supports: Special procedures and assembly of components.

E. Manufacturer's Certificate: Products meet or exceed specified requirements.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS

A. Materials and Finishes: Provide adequate corrosion resistance.

B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.

C. Anchors and Fasteners:

1. Concrete Structural Elements: Provide precast inserts , expansion anchors, epoxy anchors and preset inserts.
2. Steel Structural Elements: Provide beam clamps, steel ramset fasteners, and welded fasteners.
3. Concrete Surfaces: Provide self-drilling anchors, epoxy anchors, and expansion anchors.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
5. Solid Masonry Walls: Provide expansion anchors, expansion anchors, and preset inserts.
6. Sheet Metal: Provide sheet metal screws.
7. Wood Elements: Provide wood screws.

2.2 CONDUIT SUPPORTS

A. Manufacturers:

1. ABB, Electrification Business.
2. Adalet.
3. CADDY; nVent.
4. Minerallac Company.
5. MIRO Industries.
6. Unistrut; Atkore International.
7. Cooper B-Line.
8. Substitutions: Under provisions of Section 01 60 00.

B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

D. Conduit Clamps for Trapeze Hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

E. Conduit Clamps - General Purpose: One hole malleable iron for surface mounted conduits.

2.3 STEEL CHANNEL

A. Manufacturer:

1. Cooper B-Line.
2. Unistrut.
3. Superstrut.
4. Substitutions: Under provisions of Section 01 60 00.

B. Description:

1. Indoor: Galvanized steel, channel, size accordingly to accommodate load served.
2. Outdoor: Finished with manufacture corrosion resistant finish, channel, size accordingly to accommodate load served.
3. Corrosive Environments: Stainless steel, channel, size accordingly to accommodate load served.

2.4 ROOF MOUNTED PIPING AND CONDUIT SUPPORTS

A. Acceptable Manufacturer: Dura-Blok.

B. 5" tall, UV resistant rubber block with bolted strut channel for conduit attachment. .

C. Base shall be made from 100% recycled rubber, with drainage channel through center of block. Where elevation above 5" is required, utilize additional strut material to construct rack to height of required elevation.

D. Provide 1/2" thick UV resistance rubber pad under block extending a minimum 1" beyond block in all directions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

C. Hangers and Supports:

1. Anchors and Fasteners:

a. Concrete Structural Elements: Provide precast inserts , expansion anchors, epoxy anchors and preset inserts.
b. Steel Structural Elements: Provide beam clamps, steel ramset fasteners, and welded fasteners.
c. Concrete Surfaces: Provide self-drilling anchors, epoxy anchors, and expansion anchors.
d. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
e. Solid Masonry Walls: Provide expansion anchors, expansion anchors, and preset inserts.
f. Sheet Metal: Provide sheet metal screws.
g. Wood Elements: Provide wood screws.

D. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

E. Do not use spring steel clips and clamps.

F. Do not use powder-actuated anchors.

G. Obtain permission from Architect/Engineer before drilling or cutting structural members.

H. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts. Paint exposed ends of steel channels to protect from corrosion. Provide plastic end caps by steel channel manufacture for all exposed ends below 8'.

I. Install surface-mounted cabinets with minimum of four anchors.

J. Contractor shall coordinate the installation of their work with all other contractors of the project.

K. Install all hangers and supports provided by this contract to maintain installation, maintenance, operation and working clearances of all equipment, including equipment provided by other trades.

L. Install all hangers and supports provided by this contract to maintain installation, maintenance, operation and working clearances of all existing equipment, including existing equipment of other trades.

M. Do not suspend equipment from roof decking.

END OF SECTION 26 05 29

SECTION 26 05 33 - RACEWAY AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Conduit and Tubing.
2. Surface Raceways.
3. Wireways.
4. Outlet Boxes.
5. Pull and Junction Boxes.
6. Wall and ceiling outlet boxes.

1.3 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.

C. ANSI C80.5 - Rigid Aluminum Conduit.

D. NECA (National Electrical Contractor's Association) - "Standard of Installation"

E. NEMA FB 1 (National Electrical Manufacturers Association) - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

F. NEMA OS 1 (National Electrical Manufacturers Association) - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

G. NEMA OS 2 (National Electrical Manufacturers Association) - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.

H. NEMA RN 1 (National Electrical Manufacturers Association) - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.

I. NEMA TC 2 (National Electrical Manufacturers Association) - Electrical Polyvinyl Chloride (PVC) Tbing and Conduit.

J. NEMA TC 3 (National Electrical Manufacturers Association) - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

K. NEMA WD 6 - Wiring Device Configurations.

L. NEMA 250 (National Electrical Manufacturers Association) - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.4 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

B. Underground Outside Foundation Wall: Provide rigid steel conduit, intermediate metal conduit, plastic coated rigid steel conduit, schedule 80 PVC. Where approved by all bodies having jurisdiction and indicated on drawings, provide nonmetallic conduit with steel elbows. Provide cast boxes.

C. In or Under Slab on Grade: Provide rigid steel conduit, intermediate metal conduit, plastic coated rigid steel conduit, schedule 40 PVC. Where approved by all bodies having jurisdiction and indicated on drawings, provide nonmetallic conduit with steel elbows. Provide cast boxes.

D. Outdoor Locations, Above Grade: Provide rigid steel and aluminum conduit. Provide cast metal outlet, pull, and junction boxes.

E. In Slab Above Grade: Provide rigid steel conduit or intermediate metal conduit or where approved by all bodies having jurisdiction; provide thickwall nonmetallic conduit with steel elbows. Provide cast or sheet metal boxes.

F. Wet and Damp Locations: Provide rigid steel and aluminum conduit. Provide cast metal, junction, and pull boxes. Provide flush mounting outlet box in finished areas.

G. Concealed Dry Locations: Provide rigid steel and aluminum conduit , intermediate metal conduit or electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pullboxes. Conduits 2" and below may be electrical metallic tubing. Conduits over 2" shall be rigid steel and aluminum conduit , intermediate metal conduit, unless indicated otherwise on drawings.

H. Exposed Dry Locations (unfinished areas): Provide rigid steel and aluminum conduit or intermediate metal conduit where subject to damage, otherwise provide electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pullboxes. Conduits 2" and below may be electrical metallic tubing. Conduits over 2" shall be rigid steel and aluminum conduit , intermediate metal conduit, unless indicated otherwise on drawings.

I. Exposed Dry Locations (Finished areas): Provide surface mounted raceways systems.

J. Flexible Metal Conduits: Provide for final connections (maximum 6 feet) at indoor dry locations of conductors serving equipment subject to vibration or luminaires above accessible ceilings.

K. Liquidtight Flexible Metal Conduits: Provide for final connections (maximum 6 feet) at indoor damp/wet/corrosive locations, mechanical rooms containing hydronic equipment, and outdoor locations of conductors serving equipment subject to vibration.

L. Sleeves: Provided for all cable penetrations though partitions for any and all systems. Where sleeve size is not specified on the plans, sleeves shall be provided such that no sleeve is filled beyond 40%. Seal sleeve after completion of cable pulls. Minimum size sleeve shall be 3/4" EMT.

1.5 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.6 DESIGN REQUIREMENTS

A. Minimum raceway size for concealed or exposed locations withing building: 3/4 inch. 1/2 inch conduit will be acceptable for end of the line (no more than one circuit). Branch conduits to receptacles or lighting fixtures.

B. Install all conduits concealed unless specifically called out on the drawings to be exposed. Where structural elements of the building conflict with routing of concealed conduits, contractor shall route concealed via floors, slabs, ceiling spaces or adjoining wall to bypass structural elements that can not be crossed by recessed conduits.

C. Where installing new raceways on existing walls, raceways are to be complete surface metallic raceway system.

D. Ceiling mounted devices shall be installed on a recessed metallic backbox. Provide concealed raceway system over gypsum ceilings to nearest accessible ceiling. Provide tile bridge to support backbox compatible with specified ceiling system.

E. Minimum raceway size in or below slab on grade: 1 inch.

F. Conduit Size: ANSI/NFPA 70.

1.7 SUBMITTALS

A. Product Data: Submit for surface raceway system. Provide dimensions, knockout sizes and locations, materials, fabrication details, finishes, and accessories.

B. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.8 CLOSEOUT SUBMITTALS

A. Project Record Documents:

1. Record actual routing of conduits larger than 2 inch trade size.
2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.10 QUALITY ASSURANCE

A. Perform work in accordance with NECA Standard of Installation.

1.11 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

1.12 COORDINATION

A. Coordinate installation of outlet boxes for equipment connected under other sections.

B. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

C. Contractor shall coordinate the installation of their work with all other contractors of the project.

D. Install all raceways and boxes provided by this contract to maintain installation, maintenance, operation and working clearances of all equipment, including equipment provided by other trades.

E. Install all raceways and boxes provided by this contract to maintain installation, maintenance, operation and working clearances of all existing equipment, including existing equipment of other trades.

PART 2 - PRODUCTS

2.1 METAL CONDUIT

A. Manufacturers:

1. Allied Tube and Conduit Corp.
2. Republic Conduit.
3. Wheatland Tube Company.
4. Substitutions: Under provisions of Section 01 60 00.

B. Rigid Steel Conduit: ANSI C80.1.

C. Rigid Aluminum Conduit: ANSI C80.5.

D. Intermediate Metal Conduit (IMC): Rigid steel.

E. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.2 FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. Alflex.
2. Anamet Electrical.
3. Electri-Flex Co.
4. Substitutions: Under provisions of Section 01 60 00.

B. Product Description: Interlocked steel or aluminum construction.

C. Fittings: NEMA FB 1.

2.3 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. Alflex.
2. Anamet Electrical.
3. Electri-Flex Co.
4. Substitutions: Under provisions of Section 01 60 00.

B. Product Description: Interlocked steel or aluminum construction with PVC jacket.

C. Fittings: NEMA FB 1.

2.4 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:

1. Allied Tube and Conduit Corp.
2. Republic Conduit.
3. Wheatland Tube Company.
4. Substitutions: Under provisions of Section 01 60 00.

B. Product Description: ANSI C80.3; galvanized tubing.

C. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron, compression type.

D. Provide color coded conduit for sizes 1/2" thru 4". Finish shall be factory applied by the manufacture. Conduit shall be available in 8 color options.

1. Yellow
2. Blue
3. Red
4. Green
5. Purple
6. Orange
7. White
8. Black

E. Provide "red" conduit for fire alarm conductors/cables.

2.5 NONMETALLIC CONDUIT

A. Manufacturers:

1. Cantex, Inc.
2. Carlon Electrical Products.
3. PW Pipe.
4. Substitutions: Under provisions of Section 01 60 00.

B. Product Description: NEMA TC 2; Schedule 40 or outdoors provide Schedule 80 PVC.

C. Fittings and Conduit Bodies: NEMA TC 3.

2.6 WIREWAY

A. Manufacturers:

1. Cooper B-Line.
2. Hoffman.
3. Square D Company.
4. Substitutions: Industry Standard Equivalent.

B. Product Description: General purpose or Oiltight and dusttight or Raintight type wireway.

C. Knockouts: Manufacturer's standard.

D. Size: 4 x 4 inch unless indicated larger on drawings. Provide length as required.

E. Cover: Screw cover with full gasketing.

F. Finish: Rust inhibiting primer coating with gray enamel finish.

2.7 OUTLET BOXES

A. Manufacturers: Minimum depth 2 1/8"

1. Appleton Electric.
2. OZ Gedney.
3. Raco.
4. Red Dot.
5. Thomas & Betts.
6. Substitutions: Industry Standard Equivalent.

B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 3/4 inch male fixture studs where required.
2. Concrete Ceiling Boxes: Concrete type.

C. Cast Boxes: NEMA FB 1, Type FD, aluminum or cast feralloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

D. Wall Plates for Finished Areas: As specified in Section 26 27 26.

E. Wall Plates for Unfinished Areas: Furnish gasketed cover.

F. Outlet boxes containing fire alarm cabling and devices shall be "red" in color.

2.8 AUDIO/VISUAL BACKBOXES

A. Manufacturers: Minimum depth 3"

1. Hubbell #HBL260.
2. Thomas and Betts 4 Square.
3. Raco #260.

B. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Audio Visual Back Boxes: Concentric knock outs with combinations of 3/4", 1", 1 1/4", 1 1/2", 2" are required. Minimum (2) 2" knock outs are required.

2.9 PULL AND JUNCTION BOXES

A. Manufacturers:

1. Appleton Electric.
2. Hoffman.
3. OZ Gedney.
4. Raco.
5. Thomas & Betts.
6. Substitutions: Industry Standard Equivalent.

B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

C. Surface Mounted Cast Metal Box: NEMA 250, Type 4 or 4X; flat-flanged, surface mounted junction box:

1. Material: Galvanized cast iron.
2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

D. In-Ground Cast Metal Box: NEMA 250, Type 6, outside or inside flanged, recessed cover box for flush mounting:

1. Material: Galvanized cast iron.
2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
3. Cover Legend: "ELECTRIC".

E. Fiberglass Concrete composite Handholes: Die-molded, glass-fiber concrete composite hand holes:

1. Cable Entrance: Pre-cut 6 inch x 6 inch cable entrance at center bottom of each side.
2. Cover: Glass-fiber concrete composite, weatherproof cover with nonskid finish.

F. Junction boxes containing fire alarm cabling and devices shall be "red" in color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify locations of outlets in offices and work areas prior to rough-in. Review all casework shop drawings and existing conditions prior to rough in. Report discrepancies to architect for direction.

3.2 INSTALLATION

A. Install raceway and boxes in accordance with NECA "Standard of Installation."

B. Ground and bond raceway and boxes in accordance with Section 26 05 26.

C. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.

D. Identify raceway and boxes in accordance with Section 26 05 53.

E. Arrange raceway and boxes to maintain headroom and present neat appearance.

F. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

G. Maintain headroom and present neat mechanical appearance.

H. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

I. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

J. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

K. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

L. Use flush mounting outlet box in finished areas.

M. Raceways and boxes shall not be mounted to or ran across floors or slabs.

3.3 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.

B. Arrange raceway supports to prevent misalignment during wiring installation.

C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

D. Group related raceway; support using conduit rack. Construct rack using steel channel specified in Section 26 05 29; provide space on each for 25 percent additional raceways.

E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports

F. Do not attach raceway to ceiling support wires or other piping systems.

G. Construct wireway supports from steel channel specified in Section 26 05 29.

H. Route exposed raceway parallel and perpendicular to walls.

I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.

J. Route conduit in and under slab from point-to-point.

K. Maintain clearance between raceway and piping for maintenance purposes.

L. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

M. Cut conduit square using saw or pipe cutter; de-burr cut ends.

N. Bring conduit to shoulder of fittings; fasten securely.

O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.

P. Install conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

Q. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inch size.

R. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

S. Install fittings to accommodate expansion and deflection where raceway crosses seismic, control and expansion joints.

T. Install suitable pull string or cord in each empty raceway except sleeves and nipples.

U. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

V. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.

W. Close ends and unused openings in wireway.

X. Flexible raceway systems shall not be used to penetrate roofs, floors and air/moisture barriers.

Y. Raceway systems shall not be routed thru or in HVAC ducts.

Z. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve. Provide products such as Link-Seal.

AA. Raceways routed exposed in finished areas shall be painted to match building surroundings. Submit conduit installation plans for exposed area for color assignments.

BB. Raceway labels shall be applied at intervals not exceeding 10' on center. Apply labels to all feeders, or branch circuits over 60 amps in size. Provide raceway labels where conduits rise through floors or ceilings, and where they enter panelboards, distribution boards, pull boxes, wireway. Minimum of one raceway label per length of raceway. Raceway labels shall indicate voltage of feeder contained in raceway.

3.4 INSTALLATION - SURFACE RACEWAYS

A. Install Products in accordance with manufacturer's instructions.

B. Use screws to fasten raceway channel to surfaces. Drill all tile and brick surfaces or fasten into grout lines to limit the damage to these surfaces. Construction adhesive may be used to assist in the mounting of raceway, but shall not be the primary method of support. Mount plumb and level or align with block joints to create a level appearance.

C. Close ends of raceway and unused conduit openings.

D. Ground and bond raceway under provisions of Section 26 05 26.

E. Provide supplemental lumber furring as required to shim surface raceway off of existing walls to allow for installation around columns, imperfections or other obstructions on face of wall. Furring shall be pine or oak lumber, Grade “A”. Plywood or composite wood shall not be acceptable.

F. Surface raceways shall be routed exposed between floor and ceiling. Raceway system shall not protrude above ceiling, through walls or floors or into nonaccessible spaces.

3.5 INSTALLATION - BOXES

A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings.

B. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.

C. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.

D. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

E. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

F. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

G. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.

H. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

I. Install stamped steel bridges to fasten flush mounting outlet box between studs.

J. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

K. Install adjustable steel channel fasteners for hung ceiling outlet box.

L. Do not fasten boxes to ceiling support wires or other piping systems.

M. Support boxes independently of conduit.

N. Install gang box where more than one device is mounted together. Do not use sectional box.

O. Install gang box with plaster ring for single device outlets.

P. Use cast outlet box in exterior locations exposed to the weather and wet locations.

Q. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

R. Where existing boxes are utilized it shall be the contractors responsibility to modify as required to meet the intent of this specification.

3.6 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using approved materials and methods.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

C. Locate outlet boxes to allow luminaires positioned as indicated on reflected ceiling plan.

D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

E. Contractor shall coordinate the installation of their work with all other contractors of the project.

F. Install all raceways and boxes provided by this contract to maintain installation, maintenance, operation and working clearances of all equipment, including equipment provided by other trades.

G. Install all raceways and boxes provided by this contract to maintain installation, maintenance, operation and working clearances of all existing equipment, including existing equipment of other trades.

3.7 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.

B. Install knockout closures in unused openings in boxes.

3.8 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION 26 05 33

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Nameplates and labels.
2. Wire and cable markers.
3. Raceway Labels.
4. Junction Box Labeling

1.3 REFERENCES

A. NFPA 70 - National Electrical Code.

1.4 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

1. Locations:

a. Each electrical distribution and control equipment enclosure.
b. Disconnect, starters, enclosed circuit breakers and transformers
c. Security control equipment and enclosures.
d. Communication cabinets..

2. Letter Size: Use 1/4 inch letters for identifying equipment and describing area served.

B. Labels: Machine made labels, Brother P-Type Thermal adhesive tape or similar.

1. Locations:

a. Each receptacle faceplate. Confirm installation on back or front of each faceplate with owner and architect prior to installing label.
b. Line Voltage Light Switches and Lighting Control Devices. Install on back side of device faceplate.
c. Low Voltage Lighting Control Devices. Install on back side of device faceplate.
d. Lighting Control Power Packs or Relay Packs. Adhere label to power pack in location so as to not obscure manufactures labels or nameplates.

2. Letter Size: Minimum 1/8 inch indicating panel and circuit serving load. For low Voltage Lighting Control Devices, indicate panel and circuit serving the loads controlled by the Low Voltage Lighting Control Device.

2.2 WIRE MARKERS

A. Description: Tape, split sleeve, or tubing type wire markers.

B. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.

C. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

2.3 CONDUCTOR COLOR CODING

A. Description: Color code all wire and cable as scheduled.

B. Location: Color coding shall be continuous in the wire insulation or jacket. Where colors cannot be provided, apply color coding tape of the color designated in sufficient quantity for permanency at all exposed terminals, loops and splices.

C. Wire Color Coding Schedule:

1. 208/120V., 3 phase, 4 wire system:
   A Phase - Black
   B Phase - Red
   C Phase - Blue
   Neutral - White
   Ground - Bare or Green
2. 480/277V., 3 phase, 4 wire system:
   A Phase - Brown
   B Phase - Orange
   C Phase - Yellow
   Neutral - Gray
   Ground - Bare or Green with Yellow Stripe

2.4 BOX MARKERS

A. Description: All junction boxes and device boxes serving fire alarm system devices and wiring shall be "red" in color.

2.5 RACEWAY MARKERS

A. Provide raceway markers on all raceway for feeders and branch circuits over 60 amps. Markers shall indicate operating voltage of conductors contained within raceway.

B. Black letters on orange background. Adhesive applied.

1. Manufacturers

   a. Brady
   b. Seton

2.6 PANELBOARD SCHEDULES

A. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads or other field changes

B. Provide typed circuit directory for each existing panelboard modified under contract. New directory shall include all existing loads previously documented in existing directory and new loads. Identify any breakers in existing panels that do not have load conductors terminated at their lugs and mark as spare. Leave spare breakers in the off position.

C. All panelboard schedules shall list the date created and the size and location (source panel and room) of the upstream over current protection for the feeder serving the panel.

2.7 JUNCTION/PULL BOX LABELING

A. All branch circuit junction and pull boxes shall be labeled with the source panel, circuits contained therein and the system voltage. Labeling for boxes smaller then 8"x8" may be applied utilizing permanent marker or machine made labels. Pull boxes then 8"x8" shall be by machine made label only.

B. All feeder junction and pull boxes shall be labeled with the source panel, load name, and system voltage. Labeling for all feeder junction and pull boxes shall be applied utilizing machine made labels only.

2.8 UNDERGROUND WARNING TAPE

A. Provide detectable underground warning tape along length of each underground raceway or cable. Brady #B-721 or similar.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

A. Install nameplate and label parallel to equipment lines.

B. Secure nameplate to equipment front using screws, rivets, or adhesive.

C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.

E. Provide typed panelboard directories inside all panelboards indicating description of load served.

END OF SECTION 26 05 53

SECTION 26 09 23 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Occupancy Sensors.
2. Network Lighting Controls

1.3 WORK INCLUDED

A. Contractor's work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.

B. Contractor/Supplier shall examine all general specification provisions and drawings for related electrical work required as work under Division 26.

C. Contractor shall coordinate all work described in this section with all other applicable plans and specifications, including but not limited to wiring, conduit, fixtures, HVAC systems and building management systems.

1.4 SUBMITTALS FOR REVIEW

A. See Division 01 for project requirements.

B. Manufacturer shall substantiate conformance to this specification by supplying the necessary documents, performance data and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.

C. Submit a lighting plan clearly marked by manufacturer showing proper product, location and orientation of each sensor.

D. Submit any interconnection diagrams per major subsystem showing proper wiring.

E. Submit standard catalog literature which includes performance specifications indicating compliance to the specification.

F. Submittals and complete system layout and bill of materials shall be prepared by a factory authorized Representative.

1.5 QUALITY ASSURANCE

A. Energy Code Compliance: Applicable requirements in International Energy Conservation Code - 2018, Section C405 - "Electrical Power and Lighting Systems."

1.6 QUALIFICATIONS

A. Products supplied shall be from a manufacturer that has been continuously involved in the manufacturing of occupancy sensors for a minimum of five (5) years.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 SYSTEM OPERATION

A. It shall be the contractor's responsibility to make all proper adjustments to assure owner's satisfaction with the occupancy system.

B. Factory Commissioning: It shall be the manufacturer's responsibility to verify all proper adjustments and train owner's personnel to ensure owner's satisfaction with the occupancy system.

1.9 WARRANTY

A. The manufacturer shall provide a minimum five-year warranty on all hardware devices supplied and installed.

B. The hardware warranty shall cover repair or replacement any defective products within the warranty period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. Acuity nLight.
2. Hubbell Lighting Control NX.
3. WattStopper DLM.

2.2 OCCUPANCY SENSORS

A. Wall Switch Occupancy Sensors:

1. All Wall Switch Occupancy Sensors:

a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
b. Where indicated, provide two-circuit units for control of two separate lighting loads, with separate manual controls and separately programmable operation for each load.
c. Operation: Field selectable to operate either as occupancy sensor (automatic on/off) or as vacancy sensor (manual-on/automatic off).
d. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
e. Finish: Selected by the Architect.

B. Ceiling Mounted Occupancy Sensors:

1. All Ceiling Mounted Occupancy Sensors:

a. Description: Low profile occupancy sensors designed for ceiling installation.
b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
c. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
d. Locate sensors away from areas with strong air currents such as adjacent to HVAC diffusers.
e. Layout of sensors shall account for sensitivity adjustments below maximum and any absorptive materials such as carpeting or material covered partitions.
f. Finish: White unless indicated otherwise.

C. Power Packs:

1. Power Packs for Low Voltage Occupancy Sensors:
2. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
3. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.

4. Input Supply Voltage: Dual rated for 120/277 VAC.
5. Load Rating: 20 amperes.
6. Control wiring between sensors and controls units shall be Class II, 18-24 AWG, stranded UL Classified. All control wiring shall be plenum-rated.

2.3 NETWORK LIGHTING CONTROLS

A. System Architecture

1. System shall have an architecture that is based upon three main concepts: (a) networkable intelligent lighting control devices, (b) standalone lighting control zones using distributed intelligence, (c) optional system backbone for remote, time based and global operation between control zones.

    a. Intelligent lighting control devices shall have individually addressable network communication capability and consist of one or more basic lighting control components: occupancy sensor, photocell sensor, relay, dimming output, contact closure input, analog 0-10V input, and manual wall station capable of indicating switching, dimming, and/or scene control. Combining one or more of these components into a single device enclosure shall be permissible so as to minimize overall device count of system.
    b. Lighting control zones consisting of one or more networked luminaires and intelligent lighting control devices and shall be capable of providing automatic control from sensors (occupancy and/or photocell) and manual control from local wallstations without requiring connection to a higher level system backbone; this capability is referred to as "distributed intelligence."
    c. System must be capable of interfacing directly with networked luminaires such that low voltage network cabling is used to interconnect networked luminaires with control components such as sensors, switches and system backbone.

2. The system shall be capable of providing individually addressable switching and dimming control of the following: networked luminaires, control zones to include multiple switch legs or circuits, and relay and dimming outputs from centralized panels to provide design flexibility appropriate with sequence of operations required in each project area or typical space type. A single platform shall be used for both indoor and outdoor lighting controls.
3. Lighting control zones shall be capable of being networked with a higher level system backbone to provide time based control, remote control from inputs and/or systems external to the control zone, and remote configuration and monitoring through a software.
4. All system devices shall support remote firmware update, such that physical access to each device is not necessary, for purposes of upgrading functionality at a later date.
5. System shall be capable of "out of box" sequence of operation for each control zone. Standard sequence is:

    a. All switches control all fixtures in a zone.
    b. All occupancy sensors automatically control all fixtures in the control zone with a default timeout.

B. Wired Networked Control Zone Characteristics

1. Following proper installation and provision of power, all networked devices connected together with low voltage network cable shall automatically form a functional lighting control zone without requiring any type of programming, regardless of the programming mechanism (e.g., software application, handheld remote, pushbutton). The "out of box" default sequence of operation is intended to provide typical sequence of operation so as to minimize the system startup and programming requirements and to also have functional lighting control operation prior to system startup and programming.
2. System shall be able to automatically discover all connected devices without requiring any provisioning of system or zone addresses.
3. The following types of wired networked control devices shall be provided for egress and/or emergency light fixtures:

    a. Low-Voltage power sensing: These devices shall automatically provide 100% light level upon detection of loss of power sensed via the low voltage network cable connection.
    b. UL924 Listed Line-Voltage power sensing: These devices shall be listed as emergency relays under the UL924 standard, and shall automatically close the load control relay(s) and provide 100% light output upon detection of loss of power sensed via line voltage connections.
    c. Emergency egress devices shall be provided and UL labeled by the lighting control manufacturer.

C. System Backbone and System Integration Equipment

1. System Controller

    a. System Controller shall be a multi-tasking, real-time digital control processor consisting of modular hardware with plug-in enclosed processors, communication controllers, and power supplies.
    b. System Controller shall perform the following functions:

        1) Facilitation of global network communication between different areas and control zones.
        2) Time-based control of downstream wired network devices.
        3) Linking into an Ethernet network.
        4) Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.
        5) Connection to various software interfaces, including management interface, historical database and analytics interface, visualization interface, and personal control applications.

    c. System Controller shall not require a dedicated PC or a dedicated cloud connection.
    d. Device shall automatically detect all networked devices connected to it, including those connected to wired communication bridges.
    e. Device shall have a standard and astronomical internal time clock.
    f. Shall be capable of connecting to the building Local Area Network (LAN) via IEEE 802.11.x Wireless and IEEE 802.3 Wired connection.

2.4 WIRED NETWORKED DEVICES

A. Wired Networked Wall Switches, Dimmers, Scene Controllers

1. Wall switches & dimmers shall support the following device options:

    a. Number of control zones: 1, 2 or 4
    b. Control Types Supported: On/Off or On/Off/Dimming

2. Scene controllers shall support the following device options:

    a. Number of scenes: 1, 2 or 4
    b. Control Types Supported:

        1) On/Off or On/Off/Dimming
        2) Preset Level Scene Type
        3) Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene
        4) Selecting a lighting profile to be run by the system's upstream controller so as to implement a selected lighting profile across multiple zones

B. Wired Networked Auxiliary Input / Output (I/O) Devices

1. Auxiliary Input/Output Devices shall be specified as an input or output device with the following options:

    a. Contact closure input: Input shall be programmable to support maintained or momentary inputs that can activate local or global scenes and profiles, ramp light level up or down, or toggle lights on/off.
    b. 0-10V analog input: Input shall be programmable to function as a daylight sensor.
    c. RS-232/RS-485 digital input: Input supports activation of up to 4 local or global scenes and profiles, and on/off/dimming control of up to 16 local control zones.
    d. 0-10V dimming control output, capable of sinking a minimum of 20mA of current: Output shall be programmable to support all standard sequence of operations supported by system.

C. Wired Networked Occupancy and Photosensors

1. Sensors shall utilize passive infrared (PIR) or passive dual technology (PDT) to detect both major and minor motion as defined by NEMA WD-7 standard.
2. Sensing technologies that are acoustically passive, meaning they do not transmit sounds waves of any frequency do not require additional commissioning. Ultrasonic or Microwave based sensing technologies may require commissioning due to the active nature of their technology, if factory required.
3. Sensor programming parameter shall be available and configurable remotely from the software and locally via the device.
4. Sensor mounting type shall match project design requirements as shown on plans.

    a. Sensors shall have optional features for photosensor/daylight override, dimming control, and low temperature/high humidity operation.

5. The system shall support the following types of photocell-based control:

a. On/Off: The control zone is automatically turned off if the photocell reading exceeds the defined setpoint and automatically turned on if the photocell reading is below the defined setpoint. A time delay or adaptive setpoint adjustable behavior may be used to prevent the system from exhibiting nuisance on/off switching.
b. Continuous Dimming: The control zone automatically adjusts its dimming output in response to photocell readings, such that a minimum light level consisting of both electric light and daylight sources is maintained at the task. The photocell response shall be configurable to adjust the photocell setpoint and dimming rates.

D. Distributed System Power, Switching and Dimming Controls

1. Devices shall incorporate one optional Class 1 relay, optional 0-10 VDC dimming output, and contribute low voltage Class 2 power to the rest of the system.
2. Device programming parameters shall be available and configurable remotely from the software and locally via the device push-button.
3. Device shall be plenum rated.
4. Devices shall be UL Listed for load and load type as specified on the plans.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

C. Protect installation from dust and debris of other construction activities.

3.3 INSTALLATION

A. Install lighting control devices in accordance with NECA 1 (general workmanship) and ADA, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 26 05 33 as required for installation of lighting control devices provided under this section.

1. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.
2. Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches from edge of door frame unless indicated otherwise.

C. Install and aim sensors in locations to achieve not less than 95 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

D. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceiling or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

E. Install lighting control devices in accordance with manufacturer's instructions.

F. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

G. Install lighting control devices plumb and level, and held securely in place.

H. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 27 26.

I. Provide required supports in accordance with Section 26 05 29.

J. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

K. Identify components and power and control wiring according to Section 26 05 53.

L. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

M. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

N. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.4 INSTALLATION REQUIREMENTS

A. Auxiliary and Miscellaneous Power Requirements:

1. The installing contractor shall provide all required 120V circuits required for complete operation. Upon completion of submittal document, installing contractor shall coordinate with manufacture to identify system component require 120V power connections and shall include those power connections as part of the contract at no additional costs.

B. Complete and functional system. Provide all required wiring, materials, circuits, programming and labor required for a complete and operational lighting control system.

C. Installation Procedures and Verification

1. The successful bidder shall review all required installation and pre-startup procedures with the manufacturer's representative through pre-construction meetings.
2. The successful bidder shall install and connect the networked lighting control system components according to the manufacturer's installation instructions, wiring diagrams, the project submittals and plans specifications.
3. The successful bidder shall be responsible for testing of all low voltage network cable included in the bid. Bidder is responsible for verification of the following minimum parameters:

    a. Wire Map (continuity, pin termination, shorts and open connections, etc.)
    b. Length
    c. Insertion Loss

D. Coordination with Owner's IT Network Infrastructure

1. The successful bidder is required to coordinate with the Owner's representative to secure all required network connections to the owner's IT network infrastructure.

    a. The bidder shall provide to the Owner's representative all network infrastructure requirements of the networked lighting control system.
    b. The bidder shall provide to the manufacturer's representative all necessary contacts pertaining to the Owner's IT infrastructure, to ensure that the system is properly connected and started up.

E. Documentation and Deliverables

1. The installing contractor shall be responsible for documenting installed location of all networked devices. This includes responsibility to provide as-built plan drawing showing device address barcodes corresponding to locations of installed equipment.
2. The installing contractor is also responsible for the following additional documentation to the manufacturer's representative if visualization / graphical floorplan software is provided as part of bid package:

    a. As-Built floor plan drawings showing device address locations required above. All documentation shall remain legible when reproducing\scanning drawing files for electronic submission.
    b. As-Built electrical lighting drawings (reflected ceiling plan) in PDF and CAD format. Architectural floor plans shall be based on as-built conditions.

        1) CAD files shall have layers already turned on/off as desired to be shown in the graphical floorplan background images. The following CAD elements are recommended to be hidden to produce an ideal background graphical image:

            i) Titleblock
            ii) Text- Inclusive of room names and numbers, fixture tags and drawings notes

iii) Fixture wiring and homeruns
iv) Control devices
v) Hatching or poché of light fixtures or architectural elements

2) CAD files shall be of AutoCAD 2013 or earlier. Revit file overall floor plan views shall be exported to AutoCAD 2013.

3.5 FIELD QUALITY CONTROL

A. Inspect each lighting control device for damage and defects.

B. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.

C. Test daylighting controls to verify proper operation, including light level measurements and time delays where applicable.

D. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.6 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated.

C. Adjust position of directional occupancy sensors and outdoor motion sensors to achieve optimal coverage as required.

D. Adjust time switch settings to achieve desired operation schedule as indicated or as requested by Owner's representative.

E. Adjust daylighting controls under optimum lighting conditions after all room finishes, furniture, and window treatments have been installed to achieve desired operation as indicated.

3.7 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.8 SYSTEM STARTUP

A. Upon completion of installation by the installer, including completion of all required verification and documentation required by the manufacturer, the system shall be started up and programmed.

1. For CAT5e wired devices, low voltage network cable testing shall be performed prior to system startup.
2. System start-up and programming shall include:

a. Verifying operational communication to all system devices.
b. Programming the network devices into functional control zones to meet the required sequence of operation.

c. Programming and verifying all sequence of operations.

3. Initial start-up and programming is to occur on-site.

END OF SECTION 26 09 23

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Branch circuit panelboards.

1.3 REFERENCES

A. NECA Standard of Installation (published by the National Electrical Contractors Association).

B. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

D. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000, with Errata (2008).

E. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.

F. NEMA PB 1 - Panelboards; 2011.

G. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.

H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.

I. UL 67 - Panelboards; Current Edition, Including All Revisions.

J. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

K. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

L. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.
2. Include wiring diagrams showing all factory and field connections.
3. Clearly indicate short circuit current ratings.

1.5 CLOSEOUT SUBMITTALS

A. See Division 01 for project requirements.

B. Record actual locations of panelboards and record actual circuiting arrangements in project record documents.

C. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.6 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories through on source from a single manufacturer.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.9 MAINTENANCE MATERIALS

A. See Division 01 for project requirements.

B. Furnish two of each panelboard key.

PART 2 - PRODUCTS

2.1 DISTRIBUTION PANELBOARDS

A. Manufacturers:

1. Eaton.
2. Square D.
3. Siemens.

B. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

C. Conductor Terminations:

1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
2. Main and Neutral Lug Type: Compression.

D. Bussing:

1. Phase and Neutral Bus Material: Copper.
2. Ground Bus Material: Copper.

E. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt panelboards, 14,000 amperes rms symmetrical for 480 volt panelboards.

F. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

G. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1, bolt-on type circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.

H. Current Limiting Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.

I. Circuit Breaker Accessories:

1. Trip units and auxiliary switches as indicated on drawings.
2. Branch breaker locking accessories. Where indicated on the drawings provide manufacture accessory to lock breaker in off position. lockout accessory shall be attached to panel or breaker at all times regardless of if breaker is in on or off position.

J. Enclosure:

1. Provide surface or recess mounted enclosures as indicated on Drawings.
2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Provide metal circuit directory holder mounted on inside of door.
4. Provide manufacturer's standard finish of gray enamel.

K. Nameplate: Provide identification nameplates indicating panelboard designation. At distribution devices indicate the designation of the equipment followed by the area served.

L. Distribution panelboards shall be fully rated to meet the short circuit current rating shown on the drawings.

M. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.2 BRANCH CIRCUIT PANELBOARDS

A. Manufacturers:

1. Eaton.
2. Square D.
3. Siemens.

B. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

C. Conductor Terminations:

1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
2. Main and Neutral Lug Type: Compression.

D. Bussing:

1. Phase and Neutral Bus Material: Copper.
2. Ground Bus Material: Copper.

E. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt panelboards, 14,000 amperes rms symmetrical for 480 volt panelboards.

F. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

G. Molded Case Circuit Breakers with Current Limiters: NEMA AB 1, bolt-on type circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.

H. Current Limiting Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.

I. Circuit Breaker Accessories:

1. Trip units and auxiliary switches as indicated on drawings.
2. Branch breaker locking accessories. Where indicated on the drawings provide manufacture accessory to lock breaker in off position. lockout accessory shall be attached to panel or breaker at all times regardless of if breaker is in on or off position.

J. Enclosure:

1. Provide surface or recess mounted enclosures as indicated on Drawings.
2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Provide metal circuit directory holder mounted on inside of door.
4. Provide manufacturer's standard finish of gray enamel.

K. Nameplate: Provide identification nameplates indicating panelboard designation. At distribution devices indicate the designation of the equipment followed by the area served.

L. Panelboards shall be fully rated to meet the short circuit current rating shown on the drawings.

M. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions. Include (6) spare 20A-1P circuit breakers in all panelboards rated 400A and below.

N. Main devices shall be individually mounted and not take up available spaces for branch circuits. Branch mounted main devices are not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

C. Install panelboards plumb.

D. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

E. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.

F. Mount floor-mounted power distribution panelboards on properly sized 3 inch tall cast-in-place concrete pad.

G. Provide filler plates for unused spaces in panelboards.

H. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

I. Provide typed circuit directory for each existing panelboard modified under contract. New directory shall include all existing loads previously documented in existing directory and new loads. Identify any breakers in existing panels that do not have load conductors terminated at their lugs and mark as spare. Leave spare breakers in the off position.

J. All panelboard schedules shall list the date created and the size and location (source panel and room) of the upstream over current protection for the feeder serving the panel.

K. Install engraved plastic nameplates under the provisions of Section 26 05 53.

L. Provide minimum of (5) spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor. Identify each as SPARE.

M. Ground and bond panelboard enclosure according to Section 26 05 26. Connect equipment ground bars of panels in accordance with NFPA 70.

N. Where circuit breakers serves a hand dryer or other similar motor driven appliance, provide lock out accessory in panelboard to enable lockout of circuit breaker for servicing.

3.2 FIELD QUALITY CONTROL

A. See Division 01 for project requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.

D. Perform switch inspections and tests listed in NETA ATS, Section 7.5.

E. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.3 ADJUSTING

A. See Division 01 for project requirements.

B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

C. Adjust alignment of panelboard fronts.

D. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

3.4 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 26 24 16

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wall Switches.
2. General Purpose Receptacles.
3. Ground Fault Type Receptacles.
4. Wall Plates.

1.3 REFERENCES

A. NECA 1 - Standard for Good Workmanship in Electrical Construction.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices.

C. NEMA WD 1 - General Requirements for Wiring Devices.

D. NEMA WD 6 - Wiring Device - Dimensional Requirements.

E. UL 20 - General-Use Snap Switches

F. UL 355 - UL Standard for Safety Cord Reels

G. UL 498 - Attachment Plugs and Receptacles

H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices

I. UL 943 - Ground-Fault Circuit-Interrupters

J. NFPA 70 - National Electrical Code.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

1.5 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.6 SUBMITTALS

A. See Division 01 for project requirements.

B. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

A. Manufacturers:

1. Pass & Seymour #2621.
2. Hubbell.
3. Leviton.
4. Cooper Wiring Devices.

B. Description: NEMA WD 1, NEMA WD 6, UL 20, Heavy Duty specification grade, AC only general-use snap switch.

C. Body and Handle: Plastic with paddle handle, color to be white.

D. Ratings:

1. Voltage: 120-277 volts, AC.
2. Current: 20 amperes.

E. Toggle Switches: Heavy Duty specification grade, 20A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, three way, or four way as indicated on the drawings.

F. Key-operated Switches: 120-277VAC, 20A, single pole, with factory supplied key in lieu of switch handle similar to Leviton #1221-2L. Provide three way, four way switches where indicated on drawings.

G. Lighted Wall Switches: Heavy Duty specification grade, 20 A, 120/277 V with illuminated standard toggle type switch actuator and maintained contacts; illuminated with load off; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

H. Pilot Light Wall Switches: Heavy Duty specification grade, 20 A, 120/277 V with red illuminated standard toggle type switch actuator and maintained contacts; illuminated with load on; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.2 GENERAL PURPOSE RECEPTACLES

A. Manufacturers:

1. Pass & Seymour #TR5362.
2. Leviton.
3. Hubbell.
4. Cooper Wiring Devices.

B. Description: NEMA WD 1, UL 498, specification grade, tamper-resistant type receptacle.

C. Device Body: Flush, nylon face, back and side wired, color to be white.

D. Configuration: NEMA WD 6, type as specified and indicated.

E. Convenience Receptacle: Type 5-20.

F. All dual-controlled receptacles shall be similar to Pass & Seymour #TR5362CD. All half-controlled receptacles shall be similar to Pass & Seymour #TR5362CH.

2.3 GROUND FAULT TYPE RECEPTACLES

A. Manufacturers:

1. Pass & Seymour #2097TR.
2. Hubbell
3. Leviton.
4. Cooper Wiring Devices.

B. Description: NEMA WD 1, UL 498, specification grade, tamper-resistant type, GFCI duplex receptacle.

C. Device Body: Flush, polycarbonate face, back and side wired, color to be white.

D. Configuration: NEMA WD 6, type as specified and indicated.

E. Convenience Receptacle: Type 5-20.

F. Self testing per 2015 revisions to UL 943.

G. All receptacles on exterior of building shall be Pass & Seymour #2097TRWRNA, duplex, NEMA 5-20, 125 volt, with ground fault interrupter and mounted in while-in-use, extra-duty, die-cast metallic weatherproof cover in compliance with NEC Article 406.9(B).

2.4 WALL PLATES

A. Decorative Cover Plate: In finished areas for switches and receptacles, provide type 302/304 brushed stainless steel by same manufacturer as device.
B. Cover plate: In unfinished areas provide cadmium plated steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Division 01 for project requirements.

B. Verify that outlet boxes are installed at proper height.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install receptacles with grounding pole on bottom.

E. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

G. Connect wiring devices by wrapping conductor around screw terminal.

H. Use jumbo size plates for outlets installed in masonry walls.

I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

J. Provide ground fault circuit interrupter protection for all receptacles located outdoors, in wet areas and within six feet of a sink.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Install wall switches, lighting control stations, call buttons, volume controls, fire alarm pull stations or other operable control devices 48 inches above finished floor to centerline.

B. Install convenience receptacle 16 inches above finished floor.

C. Install convenience receptacle 6 inches above counter or back splash of counter.

3.5 FIELD QUALITY CONTROL

A. See Division 01 for project requirements.

B. Inspect each wiring device for defects.

C. Operate each wall switch with circuit energized and verify proper operation.

D. Verify that each receptacle device is energized.

E. Test each receptacle device for proper polarity.

F. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

A. See Division 01 for project requirements.

B. Adjust devices and wall plates to be flush and level.

3.7 CLEANING

A. See Division 01 for project requirements.

B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 26 27 26

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. LED Luminaires.
2. LED Drivers.
3. Exit Signs.
4. Emergency Lighting Units.

1.3 REFERENCES

A. ANSI C78.379 - Electric Lamps - Incandescent and High-Intensity Discharge Reflector Lamps - Classification of Beam Patterns.

B. ANSI C82.1 - American National Standard for Lamp Ballast-Line Frequency Fluorescent Lamp Ballast.

C. ANSI C82.4 - Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type).

D. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

E. NFPA 70 - National Electrical Code.

F. NFPA 101 - Life Safety Code.

G. IESNA LM-79-08 - Electrical and Photometric Measurements of Solid State Lighting Products.

H. IESNA LM-80-08 - Measuring Lumen Maintenance of LED Light Sources.

I. UL 8750 - Underwriters Laboratories Safety Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products.

1.4 SUBMITTALS FOR REVIEW

A. See Division 01 for project requirements.

B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

C. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on dimensions, features, performance data, accessories, and finishes.

1.5 QUALITY ASSURANCE

A. Energy Code Compliance: Applicable requirements in International Energy Conservation Code - 2018

1. Section C405 - "Electrical Power and Lighting Systems."
2. Section C408.3 - ”Lighting System Functional Testing.”

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.8 EXTRA PRODUCTS

A. See Division 01 for project requirements.

1.9 WARRANTY

A. General Warranty: Special warranty specified in this Section shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranties for LED Drivers: Written warranty, executed by manufacturer agreeing to replace LED drivers that fail in materials or workmanship within specified warranty period.

1. Special Warranty Period for LED Drivers: Five years from date of manufacture.

PART 2 - PRODUCTS

2.1 LUMINAIRES

A. Furnish Products with features, options and accessories as scheduled.

2.2 LED DRIVERS

A. Minimum Efficiency: 85% at full load.

B. Minimum Operating Ambient Temperature: -20°C. (-4°F).

C. Input Voltage: 120-277V (±10%) at 60 Hz.

D. Integral short circuit, open circuit, and overload protection.

E. Power Factor: > 0.90.

F. Total Harmonic Distortion: < 20%.

G. LED drivers shall have a fully isolated 0-10V control inputs.

H. All LED drivers shall be capable of 0-10V dimming with linear dimming curve.

2.3 LED LUMINAIRES

A. LED fixtures shall be designed as a complete unit consisting of a fully factory assembled unit or as a system of manufacture designed components intended for use as a UL listed complete assembly. The use of retrofit kits or lamps in standard fluorescent, HID or incandescent light fixtures is not acceptable.

2.4 EXIT SIGNS

A. Furnish Products as scheduled.

B. General Requirements: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

C. Lamps: LEDs, 50,000 hours minimum rated lamp life.

2.5 EMERGENCY LIGHTING UNITS

A. Furnish Products as scheduled.

B. General Requirements: Self-contained units complying with UL 924.

C. Battery: Sealed, maintenance-free, nickel-cadmium type.

D. Charger: Fully automatic, solid-state type with sealed transfer relay.

E. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

F. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

G. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

H. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.

I. Integral Time-Delay Relay: Holds unit on for fixed interval of 15 minutes when power is restored after an outage.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Where required install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

B. Support luminaires independent of ceiling framing.

C. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

D. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.

E. Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure. Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires. Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips. Reuse existing supports if applicable.

F. Install recessed luminaires to permit removal from below.

G. Install recessed luminaires using accessories and fire stopping materials to meet regulatory requirements for fire rating.

H. Install clips to secure recessed grid-supported luminaires in place.

I. Install wall mounted luminaires, emergency lighting units and exit signs at height as indicated on drawings or as required to serve intended purpose.

J. Install accessories furnished with each luminaire.

K. Connect luminaires, emergency lighting units and exit signs to branch circuit outlets provided under Section 26 05 33 using flexible conduit as indicated.

L. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

M. Bond products and metal accessories to branch circuit equipment grounding conductor.

N. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

O. Prior to installation exit sign may require field relocation to accommodate ceiling heights, structure, Fire Inspector requirements or aesthetics, include relocation of within ten feet of location shown.

3.2 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

A. Aim and adjust luminaires as indicated or as required to serve intended purpose.

B. Position exit sign directional arrows as required.

3.4 CLEANING

A. See Division 01 for project requirements.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosures.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

3.5 PROTECTION OF FINISHED WORK

A. See Division 01 for project requirements.

B. Replace failed or faulty ballasts or LED modules or LED drivers at Substantial Completion.

C. Relamp luminaires that have failed lamps at Substantial Completion.

END OF SECTION 26 51 00

SECTION 27 15 00 - DATA COMMUNICATIONS NETWORK CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section defines the requirements for the installation of the structured cabling system. The system consists of twisted pair cabling, and related hardware. In addition to the basic cable plant requirements, the testing and identification requirements are also defined.

B. Section Includes:

1. Twisted Pair Cable
2. Patch Panels
3. Jacks
4. Faceplates
5. Wire Management
6. Fiber Optic Cable and Interconnecting Devices

1.3 SYSTEM DESCRIPTION

A. Contractor provides all raceways, outlet boxes, cables, termination hardware, patch panels, communication outlets, J-hooks, all supporting hardware, testing, certifications and documentation, and identification as required for a complete information system as specified in this section and indicated on the drawings.

B. Data drop locations will consist of proposed Category 6 cables and proposed Category 6 jacks used for voice and data communications. Jacks are to be installed in multi-port faceplates that are compatible with the surface raceway or backboxes as indicated on the drawings.

C. Drop configurations will primarily consist of:

1. Data Outlet: Two proposed Category 6 data cables and jacks unless indicated otherwise on drawings.

D. All data cabling is to be routed through accessible ceiling space to IDF closets as indicated on drawings. Data cabling is to be terminated on Category 6 patch panels.

E. Provide cabling and termination equipment between the existing MDF and new IDF closets. Backbone media is to consist of one (1) 6-strand 50/125 micron OM3 multimode fiber optic cable. Route fiber optic cable in 2" inner-duct.

F. All drops, patch panels and wiring blocks are to be labeled with machine printed label strips. No hand lettered labeling will be accepted.

G. Front end data network computers and equipment will be furnished and installed by others.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. A company having at least five (5) years' experience in the installation and testing of the type of system specified, and:

a. Employing a BICSI Registered Communications Distribution Designer (RCDD).

1) If personnel of Contractor are not BICSI-trained and -certified, Contractor to submit with bid all necessary credentials and certificates of training for personnel staff that said credentials and certificates are equal to BICSI standards. The project shall be staffed at all times by Installers and Technicians who, in the role of lead crafts persons, will be able to provide leadership and technical resources for the remaining crafts persons on the project.

b. Supervisors and installers factory certified by manufacturers of products to be installed.

1) Shall be certified by the manufacturing company(-ies) in all aspects of installation and testing of the products described within the telecommunications systems specifications. Specifically, those manufacturer(s) whose components constitute a component of the structured cabling system(s) installed as part of the voice and data transport systems.

B. Materials and equipment shall be the standard product of a manufacturer regularly engaged in the production of the required type of material or equipment for at least five (5) years shall be the manufacturer's latest design with published properties.

C. Source Limitations: Equipment and materials of the same general type shall be of the same manufacturer throughout the project to provide uniform appearance, operation and maintenance.

D. Equipment and materials shall be without blemish or defect.

E. Listing and Labeling: Provide telecommunication cables, termination hardware, devices and equipment that are listed and labeled by Underwriters Laboratories, Inc. (UL).

F. NEC Compliance: Comply with requirements of NFPA 70, “National Electrical Code” as applicable to telecommunication cables.

G. ANSI/TIA Compliance: Comply with ANSI/TIA standards.

H. The telecommunication cable installer shall be licensed in the State of Illinois.

1.5 REFERENCE STANDARDS

A. NFPA 70: The National Electrical Code

B. ANSI/TIA-568.0-E: Generic Telecommunications Cabling for Customer Premise

C. ANSI/TIA-568.1-E: Commercial Building Telecommunications Cabling

D. ANSI/TIA-568.2-D: Balanced Twisted-Pair Telecommunications Cabling and Components

E. ANSI/TIA-568.3-D, Optical Fiber Cabling And Components Standard

F. ANSI/TIA-568.4-D: Broadband Coaxial Cabling and Components Standard

G. ANSI/TIA-569-E: Telecommunications Pathways and Spaces

H. ANSI/TIA-606-C: Administration Standard for Telecommunications Infrastructure

I. ANSI/TIA-607-D: Generic Telecommunications Bonding and Grounding for Customer Premises

J. ANSI/TIA-1152-A: Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling

K. ANSI/TIA-4966: Telecommunications Infrastructure Standard for Educational Facilities

1.6 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.7 SUBMITTALS

A. See Division 01 for project requirements.

B. Prior to Installation:

1. Manufacturer cut sheets, product performance data, and installation instructions for each component including cables, termination hardware, patch panels, identification labels, racks, etc.

C. Project Closeout Submittals:

1. As-built record drawings including floor plans, telecommunication closet layouts, cable assignment records, cross-connect documentation, cable and termination labeling.
2. Updated pull schedules reflecting all changes made in the field.
3. Full documentation of the cable plant test results for proposed Category 6: Must conform to test parameters specified for Level IIIe testers in accordance with ANSI/TIA-1152.

a. End-to-end continuity.
b. End-to-end attenuation.
c. Requirements listed in 3.5 of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Do not deliver or install equipment frames and ladder rack until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and work above ceilings is complete.

C. Receive, handle, and store communications system items and materials at the project site. Materials and items shall be placed so that they are protected from damage and deterioration.

D. Stage materials in a secure area of the project site until installation.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide a complete tested and certified information system including but not limited to:

1. Category 6 horizontal cabling.
2. Termination hardware.
3. Patch equipment.
4. Supports and mounting hardware.
5. Identification and labeling.

B. Each information outlet shall be configured as indicated on the drawings.

C. All telecommunications cabling work shall be in accordance with ANSI/TIA standards 568, 569, and 606. Grounding and bonding shall be in accordance with ANSI/TIA-607.

D. End-to-end proposed Category 6 channel must be maintained, including patch panels, jacks and patch cords (of the same manufacturer) and the complete cable installation shall comply with ANSI/TIA-568.

2.2 PATHWAY

A. Comply with ANSI/TIA-569.

B. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable. Use to train and manage communications cabling routed on plywood backboard.

1. Support brackets with cable tie slots for fastening cable ties to brackets.
2. Lacing bars, spools, and D-rings.
3. Hook and loop (Velcro) cable ties.

C. Ladder Rack Runway: Used for routing of communications cabling within MDF and IDFs.

D. Conduit and Boxes: Comply with requirements in Section 260533 - Raceway and Boxes. Flexible metal conduit shall not be used.

1. Boxes shall be double-gang, 2-7/8 inches deep, with single-gang trim plates unless indicated otherwise on drawings.

2.3 CABLE AND CONNECTING HARDWARE

A. Horizontal Cabling

1. UL-Listed, 100 ohm, 4-pair, unshielded twisted pair (UTP), Category 6, plenum (CMP) rated cable.

a. Berk-Tek LANmark-6
b. Mohawk 6 LAN
c. Hubbell NextSpeed
d. Panduit TX6

2. UL-Listed, 100 ohm, 4-pair, foiled/unshielded twisted pair (F/UTP), Category 6A, plenum (CMP) rated cable in overall shielded jacket.

a. Berk-Tek LANmark-10G
b. Belden 10GX
c. Hubbell NextSpeed Ascent
d. Panduit TX6A

B. Data/Voice Connectors

1. Modular, 8-position/8-conductor, T568B wired, RJ-45 style, Category 6 jacks. Color as specified on drawings or to match building standard.

a. Hubbell HXJ6
b. Panduit
c. Leviton

2. Refer to drawings for typical arrangement of telecommunication outlets.

3. Modular, 8-position/8-conductor, T568B wired, RJ-45 style, Category 6A shielded jacks. Color as specified on drawings or to match building standard.

    a. Hubbell HXJ6A
    b. Panduit
    c. Leviton

C. Wall Plates

1. Manufacturers:

    a. Hubbell
    b. Panduit
    c. Leviton

2. Accepts quantity of modular jacks/inserts indicated on drawings.
3. Type 302/304 brushed stainless steel to match wiring devices.
4. For use with snap-in jacks accommodating UTP cables. Jacks shall snap firmly into faceplate frame and be flush with outer plate surface.
5. Provide color-matched snap-in blank insets to fill all unused openings.
6. Legend: Snap-in, clear-label covers and machine-printed paper inserts.

D. Patch Panels

1. UL-Listed, modular panel housing multiple-numbered units capable of accepting RJ-45 jacks.

    a. Hubbell
    b. Panduit
    c. Leviton

2. Number of Ports: As required to accommodate quantity of cables indicate on drawings.
3. Capacity: Provide quantity of panels sufficient for number of cables to be terminated plus 25 percent spare.
4. Mounting: Rack-mount, complying with EIA/ECA-310 standard for 19-inch width.
5. Identification: Permanently imprinted sequentially numbered identification of ports, and clear space above ports for an administrative labeling system to accommodate machine-labeled identification of individual jack ports.
6. Horizontal cable termination on rear of panel. Provide incoming cable strain relief and routing guides on back of panel.
7. Patch Panel ports shall utilize 110 punch down termination on back panel and include retention cap for reach port.
8. Patch Panels shall be constructed of high strength steel with black powder finish.
9. Color: Black.

E. Floor Mounted Rack

1. 19" aluminum ANSI/TIA floor mounted relay rack, for mounting the data cable patch equipment and LAN hubs, rack includes two (2) 6" wide vertical cable channels.

    a. Hubbell #HPW84CMRR19.
    b. Cooper B-Line.
    c. Panduit.

2. Provide racks with:

a. One multi-receptacle 19" rack mounted power strip, circuit breaker protected, eight (8) spaced power receptacles, and 10 foot cord set. Hubbell #MCCPSS19TS or similar.
b. Grounding bar with #6AWG insulated equipment grounding conductor bonded to the signal ground bus in the closet.

F. Wall Mounted Rack

1. 19" aluminum ANSI/TIA wall mounted swing gate relay rack for mounting the data and voice cable patch equipment and LAN hubs.

a. Hubbell #HPWWMR48.
b. Cooper B-Line.
c. Panduit.

2. Provide racks with:
a. One (1) multi-receptacle 19" rack mounted power strip, circuit breaker protected, eight spaced power receptacles, Hubbell #MCCPSS19TS or similar, and 10 foot cord set.
b. Grounding bar with #6AWG insulated equipment grounding conductor bonded to the signal ground bus in the closet.

G. Backboards

1. Provide 3/4" thick fire rated plywood backboard in closet as indicated. Paint with two (2) coats of fire retarding white paint before mounting any hardware.

2.4 FIBER OPTIC CABLE AND INTERCONNECTING DEVICES

A. Fiber Optic Backbone Cable

1. Manufacturers:

a. Belden
b. Berk-Tek
c. CommScope
d. Corning Optical Communications
e. General Cable Technologies Corporation
f. Mohawk
g. Superior Essex

2. Description: Tight buffered, non-conductive fiber optic cable complying with TIA-568-C.3, TIA-598-D, ICEA S-83-596 and listed as complying with UL 444 and UL 1651 for the following types:

a. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.

B. Cable Type: 6-Strand, Multimode, laser-optimized 50/125 um (OM3) complying with TIA-492AAAC-B.

C. Cable Jacket:

1. Laser-Optimized Multimode Fiber (OM3/OM4): Aqua (unless otherwise indicated).
2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-568-C.3.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

D. Fiber Optic Interconnecting Devices

1. Manufacturers:

   a. Belden
   b. Corning Optical Communications
   c. Hubbell Premise Wiring
   d. Leviton
   e. Ortronics / Legrand
   f. Panduit Corporation
   g. CommScope

2. Cable Connecting Hardware: Comply with the Fiber Optic Connector Intermateability Standards (FOCIS) specifications of TIA-604-2, TIA-604-3, and TIA/EIA-604-12. Comply with TIA-568-C.3.
3. Fiber Optic Termination Housing: Rack-mounted, with multi-numbered, duplex connector insert adapter panels holding fiber optic strand connectors.

   a. General: Housing shall be modular in design with management clips that provide slack storage to comply with optical fiber bend radius and the recommended slack storage length, and be equipped with pullout tray for front access to fiber terminations and rear of adapter panels. Housing shall have:

      1) Administrative labeling system for identification of individual fiber ports.
      2) Anchor points and strain relief for entry of optical cable into the unit.
      3) Recessed adapter panel face, with front-mounted door that is secured with a keyed cylinder lock, clasp, or tab insert.

   b. Size: Three (3) rack units high; sized to accommodate at least six (6) adapter panels.
   c. Adapter Panels: Housing to be fitted out with adapter panels, each able to accommodate six (6) duplex LC-style quick-connect couplers (12 strands total), with blank adapter panels at all unused housing panel slots. Provide in quantity required to accommodate quantity of fiber optic cables served by housing.

4. Fiber Patch Cords: Owner to provide all patch cords.
5. Optical Cable Connectors:

   a. Field-terminated, quick-connect, simplex and duplex, Type LC connectors.
   b. Connector Performance: 500 mating cycles, when tested in accordance with TIA-455-21.
   c. Maximum Attenuation/Insertion Loss: 0.3 dB.
   d. Color: Aqua.

PART 3 - EXECUTION

3.1 DEMOLITION

A. For a renovation project in an existing building, demo and remove back to source, all abandoned communications wiring serving communications outlets and devices within the area of work. Coordinate work to not disrupt communications services to areas outside the project's area of work as may be served by components and communications infrastructure located within the project's area of work.

B. Remove and dispose of termination devices, panels, housings, outlets, mounting frames, cable supports, wire management, etc. abandoned as a result of demolition work, except where indicated for re-use and except where remove of said components would disrupt communication infrastructure and communications systems service to areas outside project's area of work.

3.2 EXAMINATION

A. Materials shall be examined for damage on receiving the materials. Reject any materials that are damaged.

B. Examine all materials before installation. Reject and materials that are damaged.

C. Examine elements and surfaces to which materials will be installed.

D. Prepare wall penetrations and verify that penetrations of rated fire walls are made using products labeled for type of wall penetrated.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Horizontal cable run above the suspended ceiling shall be installed in a neat and organized manner, straight and plumb and shall be when possible routed above accessible corridor areas. Cable drops to wall outlets shall be run in the conduit stub-ups.

B. Horizontal cables shall be run above the suspended ceilings and shall be supported through Category 6 J-hooks installed at a maximum spacing of 5 foot on-center. Coordinate cable installation with other ceiling installations including HVAC ducts, electrical fixtures and conduits, and sprinkler piping. Cable bundle droop shall not exceed 8" between supports.

C. Voice and data cables shall be run in continuous uninterrupted sections from origin to termination with no splices or couplers.

D. The Contractor shall provide conduit sleeves through all walls and floors to accommodate information cables. All sleeves shall be sized for 50 percent future growth. Fire seal sleeves using approved materials and methods once cables are pulled.

E. Cables shall be bundled by means of Velcro. Zip-ties are unacceptable.

F. Tie wraps utilized above ceilings shall be snug without deforming cable jacket.

G. The length of each Horizontal cable run shall not exceed 295 feet. Horizontal cable is defined as that length of cable from the back of the workstation outlet to the back of the Patch Panel or connecting block in the telecommunications closet. Horizontal cable shall be a continuous run of cable with no splices, bridges, or other discontinuities.

H. Maintain cable twist-rate at all termination points. The amount of cable untwist shall be no more than 1/2". Do not strip back the cable jacket any more than is necessary to terminate the individual conductors, 1 inch maximum.

I. All 110 connections shall be installed using a single 110 punch down tool and all terminations shall be trimmed flush with connector blocks.

J. Leave enough cable (approximately 12 inches at the outlet & 48 inches at the rack) to allow easy termination of the cable.

K. Cables shall not be tie wrapped to electrical conduits or other system piping.

L. D-rings shall be provided and mounted to route the horizontal cables at the backboard locations (& in chase locations as designated on the Drawings).

M. No communication or data circuit shall be run in the same conduit or raceway with power conductor.

N. Cable routing shall avoid locations of high RFI/EMI radiation or adverse environmental conditions. Maintain minimum separations of: 6" from fluorescent light fixtures, 12" from open power conductors, 4'-0" from transformers and other high voltage devices.

O. The horizontal structured cable plant shall be grounded and bonded in accordance with ANSI/TIA-607.

P. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.

Q. Do not over-cinch or crush cables.

R. Do not exceed manufacturer's recommended cable pull tension.

S. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.

3.4 IDENTIFICATION

A. Provide identification labels at all cables, outlets and termination patch panels in accordance with the contract drawings and specifications.

B. Cable labels shall be typed and covered with clear plastic laminate and shall be attached at 6" from the closet termination end and at 2"-4" from the outlet location end. Cable labels shall also be provided at the point where they entered as a bundle into the surface non-metallic raceway system.

C. Engraved nameplates shall be provided at the racks to identify patch panels.

D. Preprinted transparent adhesive labels shall be provided at all communication outlets identifying the outlet designation and the port assignments.

E. Submit samples of all identification labels, for Owners approval prior to installation.

3.5 TESTING AND CERTIFICATION

A. Copper UTP Cable Tests: Upon completion of the installation and termination of all communication cables, the horizontal cabling plant shall be end-to-end performance tested and certified for the specified cable classification categories and shall be performed in accordance with ANSI/TIA-568.

1. All installed cables shall be permanent link tested with Level IIIe testers in accordance with ANSI/TIA-568 for the following parameters:

a. Wire map.
b. Length.
c. Propagation Delay.
d. Delay Skew.
e. DC Loop Resistance.
f. DC Resistance Unbalance within a pair.
g. DC Resistance Unbalance between pairs.
h. Insertion Loss.
i. NEXT (Near-End Crosstalk).
j. PS NEXT (Power Sum Near-End Crosstalk).
k. ACR-N (Attenuation to Crosstalk Ratio Near-End).
l. PS ACR-N (Power Sum Attenuation to Crosstalk Ratio Near-End).
m. ACR-F (Attenuation to Crosstalk Ratio Far-End).
n. PS ACR-F (Power Sum Attenuation to Crosstalk Ratio Far-End).
o. Return Loss.
p. TCL (Transverse Conversion Loss).
q. ELTCTL (Equal Level Transverse Conversion Transfer Loss).
r. PS ANEXT (Power Sum Alien Near-End Crosstalk).
s. Average PS ANEXT (Average Power Sum Alien Near-End Crosstalk).
t. PS AACR-F (Power Sum Alien Attenuation to Crosstalk Ratio Far-End).
u. Average PS AACR-F (Average Power Sum Alien Attenuation to Crosstalk Ratio Far-End).

2. Installed cables shall be field-tested and pass the test requirements and analysis. A star ("*") passing shall not be considered acceptable. Any Permanent Link that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected Permanent Link meets performance requirements. The final and passing result of the tests for all Permanent Links shall be provided in the test results documentation as part of close-out requirements.

B. Fiber Optic Cable Tests: Each fiber strand shall be tested after final termination has been completed.

1. Optical Fiber Test Instruments:

a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA-568. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

2. Optical Time Domain Reflectometry Tests: After terminating optical fiber cables, one individual fiber from each backbone cable installed shall be tested using an optical time domain reflectometer (OTDR). Perform OTDR testing in accordance with manufacturer's recommended test procedures. Test to determine the installed length, continuity, and OTDR-based attenuation measurement. Provide test report identifying backbone cable identification and indicating corresponding values from tests.
3. Link End-to-End Attenuation Tests: Perform optical fiber end-to-end link tests according to ANSI/TIA-568.

    a. Multimode backbone link measurements: Test at 850 or 1300 nm in both directions according to ANSI/TIA-526-14, Method B, One Reference Jumper.
    b. Attenuation test results shall be less than that calculated according to equation in ANSI/TIA-568.
    c. These readings must not be higher than the "Optimal Attenuation Loss (OAL)". The OAL will be calculated using the manufacturer's factory certified test results, (db/km) adjusted for the actual installed lengths (dBs) plus the manufacturer's best published attenuation losses for the connector on this project and/or splice installed on this project (0.25dB for Connectors and 0.10dB for splices).
    d. Link End-to-End Attenuation Test reports shall include:

        1) Cable identification and Strand numbers.
        2) The OAL value for each link.
        3) The theoretical maximum attenuation value, per ANSI/TIA-568, for each link.
        4) Tested values for attenuation.

C. Test results shall be included as part of closeout documents.

D. End-to-end cabling will be considered defective if it does not pass tests and inspections. Correct failures and retest to demonstrate compliance; otherwise, remove and replace with new components and retest to demonstration compliance with requirements.

3.6 CABLE SCHEDULES

A. The installing contractor shall coordinate with school district representative the exact termination arrangement and identification/administration.

END OF SECTION 27 15 00

SECTION 27 51 23 - INTEGRATED COMMUNICATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Section 26 05 00 - Common Work Results for Electrical.
2. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
3. Section 26 05 33 - Raceway and Boxes.

1.3 REFERENCES

A. NFPA 70 - National Electrical Code.

B. NFPA 72 - Installation, Maintenance, and Use of Local Protective Signaling Systems.

C. NFPA72E - Automatic Fire Detectors.

D. NFPA 72G - Notification Appliances for Protective Signaling Systems.

E. NFPA72H - Guide for Test Procedures for Protective Signaling Systems.

F. NFPA 101 - Life Safety Code.

G. ANSI.

H. National Electrical Manufacturer's Association (NEMA).

I. Americans with Disabilities Act (ADA).

1.4 REGULATORY REQUIREMENTS

A. 2018 International Building Code (IBC).

B. 2018 International Mechanical Code (IMC).

C. 2018 International Fire Code (IFC).

D. 2018 International Fuel Gas Code (IFGC).

E. 2018 International Existing Building Code (IEBC).

F. 2018 International Property Maintenance Code (IPMC).

G. 2020 National Electrical Code (NEC).

H. Illinois Energy Conservation Code, Current Edition.

I. Illinois State Plumbing Code, Current Edition.

J. Illinois Accessibility Code, Current Edition.

K. Products: Listed and classified by Underwriter's Laboratories, Inc. as suitable for the purpose specified and indicated.

1.5 QUALITY ASSURANCE AND STANDARDS

A. Furnish and install all materials, labor, equipment, etc., to provide communications facilities as described herein and illustrated on the Drawings for a complete operating system. This system shall integrate with all existing components.

B. Prior to bid: visit the site, verify all existing items shown on plans, or specified, and be familiar with the working conditions, hazards, and local requirements involved. Submission of bids shall be deemed evidence of such visit. All proposals shall take these existing conditions into consideration and the lack of specific information on the Drawings shall not relieve the Contractor of any responsibility.

C. All materials, unless otherwise specified, shall be new, free from any defects, and of the best quality of their respective kinds. All like materials used shall be of the same manufacturer, model, and quality, unless otherwise specified.

D. All manufactured articles, material, and equipment shall be applied, installed connected, erected, used, cleaned, adjusted, and conditioned as recommended by the manufacturer, or as indicated in their published literature, unless specifically herein specified to the contrary.

E. Acceptable equipment manufacturers for the intercom system extension shall be as noted within these specifications.

F. Beginning installation means contractor accepts existing conditions. It is the contractor's responsibility to survey the site and include all necessary cost to perform the installation as specified. This responsibility includes testing the entire facility to ascertain that all existing devices are in working order, reporting to Architect in writing any devices not working at commencement of work. Failure to test means the Contractor accepts existing conditions. Contractor is responsible to test the entire system at completion of work and repairing any non-working devices.

1.6 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of integrated communication systems and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than five years.

B. Installer's Qualifications: Firms with at least five years of successful installation experience with projects utilizing integrated communications systems and equipment similar to that required for this project.

C. The Communications Supplier shall be an established communications and electronics contractor who has been an authorized distributor of the equipment supplied with full manufacturer's warranty privileges for no less than the last five consecutive years.

D. The Contractor shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

1.7 SOLE SOURCE RESPONSIBILITY

A. Except where specifically noted otherwise, all equipment supplied shall be the standard product of a single manufacturer of known reputation and experience in the industry. The Contractor shall have attended the manufacturer's installation and service school and upon request must show proof of attending such a school.

1.8 SCOPE OF WORK

A. Modify and extend the existing intercom and clock system as indicated on the drawings and specifications herein.

PART 2 - PRODUCTS

2.1 GENERAL PUBLIC ANNOUNCEMENT SYSTEM

A. The existing public announcement system equipment to remain. Modify and extend as required. Speakers are Owner Furnished, Contractor Installed (OFCI).

2.2 TIME CONTROL SYSTEM / SECONDARY CLOCK CORRECTION

A. Existing clock system to remain. Modify and extend as required. Clocks are Owner Furnished, Contractor Installed (OFCI).

PART 3 - EXECUTION

3.1 SCHEDULE OF WORK

A. Contractor shall coordinate his work with the Owner and other trades for times which changeover, removal of existing equipment, and new connections of existing systems can be completed.

B. Contractor shall test system components involved in this remodeling areas, including existing and new devices for proper working order. Test early enough to allow for fixing and repairing devices before school is in session.

3.2 CODE COMPLIANCE

A. Electrical work will conform to the National Electric Code and applicable local ordinances.

3.3 RACEWAYS AND CABLES

A. Low Voltage Wiring Schedule (Verify and provide per Manufacturer's recommendations)

1. Speaker/Call-back-22ga/2 twisted pair (1 pr shielded/1 pr unshielded), stranded.

2. Speaker only-18ga/l twisted pair, stranded, shielded.
3. Admin Consoles-20ga/3 individually shielded twisted pairs +(1) 14ga water pipe ground per console.
4. Terminal Blocks as required.

B. Provide plenum-rated cabling. Acceptable low-voltage cable manufacturers:

1. Belden
2. Coleman Cable
3. Communication Supply Company
4. WestPenn

C. Intercom cabling to be terminated on terminal blocks at head-end equipment as required and per Manufacturer's recommendations.

D. No splices are to be made to clock system field wiring EXCEPT within clock backboxes.

E. All 115 volt electrical conductors shall be installed in galvanized electrical metallic tubing with compression type fittings and couplings, minimum 1/2" size conduit.

F. All low voltage wires and cables concealed in walls shall be run in EMT conduit from flush outlet boxes to above accessible ceilings. Provide conduit where cables penetrate fire walls above ceilings. All EMT entering boxes shall be served with insulating throat connectors and locknuts.

G. No raceway shall be located in proximity of hot water lines or excessive heat.

H. No surface mounted raceway is allowed except where indicated on the plans.

3.4 HANGERS AND SUPPORTS

A. Use Cast "C" clamps, "U" straps, or ring hangers attached to rods, and/or brackets fastened to structure.

B. No perforated straps or tie wires permitted for supporting raceways.

C. Use wire ties for supporting low voltage cables run concealed above ceilings. Do not run cables loose on ceiling tiles. Support from structure above. Croup cables in bundles.

D. Tie mounts, plates, and anchors shall be used.

3.5 GROUNDING

A. Ground all electrical apparatus in accordance with the National Electric Code.

3.6 CUTTING AND PATCHING

A. Contractor shall do all necessary cutting and drilling of present walls, floors, ceilings, etc., for the installation of new work; but no structural work shall be cut, unless specifically shown on drawings and/or approved by the Owner. All exposed building surfaces damaged by installation or removal of electrical work shall be patched and finished in the same materials and manner as adjacent areas by this Contractor.

B. Remove all existing conduit, wire device, etc., being abandoned due to relocation.

3.7 SERVICE AND MAINTENANCE

A. The Contractor shall provide a one year warranty against defects in material and workmanship for all new equipment provided. All labor and materials shall be provided at no expense to the Owner during normal business hours.

B. The Contractor shall, at the Owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period has expired.

C. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

END OF SECTION 27 51 23