

PROJECT MANUAL

Issue for Bid

09 June 2025



Volume 1

Oakton College – Restroom Renovations

Desplaines Campus

1600 East Golf Road

Des Plaines, IL, 60016

Skokie Campus

7701 Lincoln Ave

Skokie, IL, 60077

Perkins&Will Project Number:

021075.001

Perkins&Will

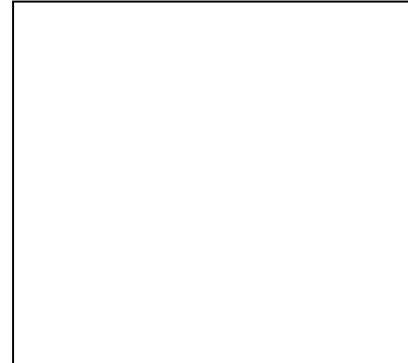
DOCUMENT 00 01 07

PROFESSIONAL SEALS PAGE

The following Documents and Specification Sections have been prepared by or under the direct supervision of the Architect:

ARCHITECT

Perkins&Will
410 North Michigan Ave., Suite 1600,
Chicago, IL 60611
312.755.0770



VOLUME 1 OF 2

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

- 00 01 07 Professional Seals Page
- 00 21 00 Instructions to Bidders
- 00 41 13 Bid Form
- 00 52 13 Form of Agreement Notice – AIA A101
- 00 61 13 Performance and Payment Bonds
- 00 72 13 General Conditions Notice – AIA A201
- 00 73 00 Supplementary Conditions

DIVISION 01 – GENERAL REQUIREMENTS

- 01 10 00 Summary
- 01 13 00 Delegated Design Requirements
- 01 21 00 Allowances
 - AEA Form
- 01 22 00 Unit Prices
- 01 23 00 Alternates
- 01 25 00 Substitution Procedures
 - Substitution Request Form
- 01 26 00 Contract Modification Procedures
- 01 29 00 Payment Procedures
- 01 31 00 Project Management and Coordination
- 01 32 00 Construction Progress Documentation
- 01 32 33 Photographic Documentation
- 01 33 00 Submittal Procedures
 - Electronic File Transfer Agreement Form (BIM)
- 01 35 16 Alteration Project Procedures
- 01 40 00 Quality Requirements

- 01 42 00 References
- 01 50 00 Temporary Facilities and Controls
- 01 60 00 Product Requirements
- 01 73 00 Execution
- 01 73 29 Cutting and Patching
- 01 77 00 Closeout Procedures
- 01 78 23 Operation and Maintenance Data
- 01 78 39 Project Record Documents
- 01 91 13 General Commissioning Requirements

DIVISION 02 – EXISTING CONDITIONS

- 02 41 19 Selective Demolition

DIVISION 03 – CONCRETE

- 03 54 16 Cement-Based Underlayment

DIVISION 04 – MASONRY

- 04 22 00 Concrete Unit Masonry

DIVISION 05 – METALS

- 05 43 00 Slotted Channel Framing
- 05 50 00 Metal Fabrications

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

- 06 10 53 Miscellaneous Carpentry
- 06 41 16 Plastic-Laminate-Clad Architectural Panels
- 06 61 16 Solid Surfacing Countertops

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

- 07 62 00 Sheet Metal Flashing and Trim
- 07 84 13 Penetration Firestopping
- 07 84 43 Joint Firestopping
- 07 92 00 Joint Sealants
- 07 92 13 Acoustical Joint Sealants

DIVISION 08 – OPENINGS

- 08 11 13 Hollow Metal Doors and Frames
- 08 14 16 Flush Wood Doors
- 08 41 13 Aluminum Framed Entrances and Storefronts
- 08 71 00 Door Hardware
- 08 71 13 Automatic Door Operators
- 08 80 00 Glazing
- 08 83 00 Mirrors

DIVISION 09 – FINISHES

- 09 22 16 Non-Structural Metal Framing
- 09 29 00 Gypsum Board
- 09 30 13 Tiling



- 09 51 13 Acoustical Panel Ceilings
- 09 65 13 Resilient Base and Accessories
- 09 91 23 Interior Painting

DIVISION 10 – SPECIALTIES

- 10 21 13 Plastic (HDPE) Toilet Compartments
- 10 28 13 Toilet Accessories

END OF ARCHITECTURAL SECTIONS
PROFESSIONAL SEALS PAGE

The following Documents and Specification Sections have been prepared by or under the direct supervision of the Engineer:

ENGINEER

Mechanical Services Assoc. Corp.
11 s. Virginia Street
Crystal Lake, IL 60014



VOLUME 2 OF 2

DIVISION 21 - FIRE SUPPRESSION

- 21 00 00 General Requirements for Fire Suppression
- 21 05 00 Common Work Results for Fire Suppression
- 21 05 29 Hangers and Supports for Fire Suppression Piping and Equipment
- 21 05 53 Identification for Fire Suppression Piping and Equipment
- 21 13 13 Wet-Pipe Sprinkler Systems

DIVISION 22 – PLUMBING

- 22 00 00 General Requirements for Plumbing
- 22 05 00 Common Work Results for Plumbing
- 22 05 23 General-Duty Valves for Plumbing Piping
- 22 05 29 Hangers and Supports for Plumbing Piping and Equipment
- 22 05 53 Identification for Plumbing Piping and Equipment
- 22 07 19 Plumbing Piping Insulation
- 22 11 16 Domestic Water Piping
- 22 11 19 Domestic Water Piping Specialties
- 22 13 16 Sanitary Waste and Vent Piping
- 22 13 19 Sanitary Waste Piping Specialties
- 22 40 00 Plumbing Fixtures

DIVISION 23 - HEATING, VENTILATING AND AIR CONDITIONING

- 23 00 00 General Requirements for Heating, Ventilating and Air Conditioning
- 23 05 00 Common Work Results for HVAC
- 23 05 29 Hangers and Supports for HVAC Piping and Equipment
- 23 05 48 Vibration Controls for HVAC Piping and Equipment
- 23 05 53 Identification for HVAC Piping and Equipment
- 23 05 93 Testing, Adjusting, and Balancing for HVAC
- 23 07 13 Duct Insulation
- 23 09 00 Instrumentation and Control for HVAC
- 23 09 93 Sequence of Operations for HVAC Controls
- 23 31 13 Metal Ducts
- 23 33 00 Air Duct Accessories
- 23 36 00 Air Terminal Units
- 23 37 13 Diffusers, Registers, And Grilles



DIVISION 26 - ELECTRICAL

- 26 00 00 Electrical, General
- 26 05 00 Common Work Results for Electrical
- 26 05 19 Low-Voltage Electrical Power Conductors and Cables
- 26 05 23 Control-Voltage Electrical Power Cables
- 26 05 26 Grounding and Bonding for Electrical Systems
- 26 05 29 Hangers and Supports for Electrical Systems
- 26 05 33 Raceways and Boxes for Electrical Systems
- 26 05 53 Identification for Electrical Systems
- 26 09 23 Lighting Control Devices
- 26 27 26 Wiring Devices
- 26 28 13 Fuses
- 26 28 16 Enclosed Switches and Circuit Breakers
- 26 51 00 Interior Lighting

DIVISION 27 - COMMUNICATIONS

- 27 05 00 Common Work Results for Communications
- 27 51 16 Public Address System

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

- 28 05 00 Common Work Results for Electronic Safety and Security
- 28 05 13 Conductors and Cables for Electronic Safety and Security
- 28 31 11 Fire-Alarm and Voice-Notification System

END OF SECTION

DOCUMENT NO. 00 21 00
INSTRUCTIONS TO BIDDERS

1.1 GENERAL

- A. Bids to be considered must be made in accordance with the instructions contained herein.
- B. The Project Manual includes a copy of the Bid Form. This is for the information and convenience of the bidder and is not to be removed, filled out or executed.
- C. Separate triplicate copies of the Bid Form are to be submitted as set forth hereinafter. Blank copies will be provided loose with the Project Manual for this purpose.
- D. Bidders are asked to return Documents obtained to the Owner (Architect) under separate cover and not with their Bids.

1.2 PREPARATION

- A. Bids are to be submitted in triplicate on forms furnished.
- B. The wording of the Bid Form shall not be changed or supplemented except in accordance with the instructions.
- C. All blank spaces provided shall be filled in by typewriter or ink by the Bidder.
- D. Where both written numbers (words) and numerical figures are given, the written numbers (words) will govern in the event of conflict. Any erasures or corrections on the Bid Form must be initialed by the signed.
- E. Sign in longhand and type the name and position of the signer under signature. If the bidder is a partnership or co-partnership, each partner must sign; if a corporation, sign with the legal name of the corporation followed by the name of the state of incorporation, corporation seal and the legal signature of an officer authorized.

1.3 EXAMINATION OF SITE AND DOCUMENTS

- A. Each bidder by submitting his bid represents that he has read and understands the prepared Contract Documents and reference material and has compared them.
- B. Prior to submitting a proposal each Bidder shall examine and thoroughly familiarize himself with all existing conditions; including all applicable laws, ordinances, rules and regulations that may affect the work. Bidders shall visit the site, examine the grounds and all existing conditions, utilities and roads, and shall ascertain all conditions that might in any manner affect their work. The Drawings have been prepared on basis of surveys and observations of the site, and are intended to

present an essentially accurate indication of physical conditions at the site. This, however, shall not relieve Bidder of necessity for fully informing himself as to existing physical conditions. Ample time shall be permitted by the Owner to physically inspect the job site on the day of the pre-bid meeting. Each bidder by submitting his bid represents that he has visited the site, familiarized himself with the local conditions, compared the Contract Documents with any work in place and informed himself of all conditions, difficulties and restrictions attending the execution of the Work, including other work, if any, being performed.

- C. Failure to perform the above shall in no way entitle the bidder to additional consideration, compensation or relieve the bidder from any obligation with respect to his bid or to the Contract.

1.4 INTERPRETATION OF DOCUMENTS

- A. Each Bidder shall carefully examine all Contract Document and all addenda thereto, and shall thoroughly familiarize himself with detailed requirements thereof prior to submitting a proposal. Should a Bidder find discrepancies or ambiguities in, or omissions from Documents, or should he be in doubt as to their meaning, he shall at once, and in any event not later than 7 days prior to bid due date, notify Architect who will send a written addendum to all Bidders. Oral conversations will not be binding. All inquiries shall be directed to the Architect's office, Perkins + Will, 410 North Michigan Avenue, Suite 1600, Chicago, Illinois, 60611, TEL: 312-755-0770, FAX: 312-755-0775.
- B. Neither Owner nor Architect will be responsible for oral interpretations. Questions received less than 48 hours before the time set for receipt of bids cannot be answered.
- C. All addenda issued during the bidding period will be incorporated into the Contract Documents.
- D. Each bidder submitting a proposal must acknowledge receipt of addendum received in the blanks provided for this purpose in the Bid Form.

1.5 CONTRACTOR'S PROPOSED ALTERNATES

- A. If a bidder wishes to propose alternate products, methods or systems to those shown and specified, he may do so by indicating same in the space provided in the Bid Form. Refer also to Section 01 25 00 - SUBSTITUTION PROCEDURES of the Specifications.
- B. Should the Owner decide to accept any of such Contractor Proposed Alternates, the written contract or agreement will be so drawn as to include and define such accepted alternates, after which no substitutions or alternates will be permitted without formal Change Order.

1.6 BID SECURITY

- A. Bid security in the amount of 10 percent of the proposal shall be made payable, unconditionally, to the Owner. Security shall be certified check, cashier's check or bid bond issued by surety licensed to conduct business in the State of Illinois. All bid security will be returned as soon as practicable. If any bidder refuses to enter into a contract, or refuses to or is unable to furnish the required payment and performance bonds and insurances within 10 days after receipt of notice of acceptance of his bid, the Owner will retain his bid security as liquidated damages, but not as a penalty.

1.7 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

- A. Performance Bond and Labor and Material Payment Bond will be required warranting faithful performance of the Contract and payment of all Contract obligations. Bonds shall conform to requirements as set forth elsewhere in the Contract Documents. Costs for bonds shall be included in Base and Alternate bid(s) and amount of bonds shall be based upon the final contract amount. An irrevocable letter of credit may also be provided as an alternative to the required bond.

1.8 WITHDRAWAL AND MODIFICATIONS OF PROPOSALS

- A. Bids may be withdrawn by written or telegraphic request received from Bidders prior to the time fixed for opening.
- B. Telegraphic modifications of proposals will be considered if received prior to time set for receipt of bids. Telegraphic modifications shall not reveal amount of original or revised bid.
- C. No proposal may be withdrawn for a period of 60 days after opening, except by mutual consent of Owner and Bidder, and except that proposals may be withdrawn upon written or telegraphic request received from Bidder prior to time established for receipt of bids. Negligence on the part of Bidders in preparing proposals confers no right for withdrawal of proposals after opening.

1.9 RIGHTS RESERVED BY OTHERS

- A. Owner reserves right to reject any and all proposals when such rejection is in the interest of Owner, to reject proposals of a Bidder who has previously failed to perform properly, or complete on time, contracts of a similar nature, and to reject proposal of a Bidder who is not, in opinion of the Owner, in a position to satisfactorily perform the Contract. The Owner also reserves right to waive any informalities and technicalities in bidding. The Owner may also accept or reject any alternates that may be set forth, at the Owner's discretion. The Owner shall have the right to reject any and all bids not accompanied by a bid security or by other data required by the Bidding Documents or reject any bid which is incomplete or irregular.

1.10 BIDDER'S QUALIFICATIONS

- A. The Contractor bidding the project shall be actively engaged in work of the nature of the project described, and have adequate specialized work force and machines to do the work. Each bidder shall submit with his proposal a list of no less than four different construction projects that have been completed within the last three years and relate to the type of work specified herein as references.
- B. Under normal circumstances Contract will be awarded to lowest qualified Bidder, unless all bids are rejected. Owner reserves right, however, to award Contract in his best interest, and, therefore, reserves right to select a Bidder other than the lowest.

1.11 LICENSE OR ROYALTY FEES

- A. If the Project is designed to require or permit use of processes, articles, apparatus or equipment for which licenses, or royalty fees will be charged, fees shall be paid directly by Contractor to patentee, license or Owner or such processes, and fees shall be included in bid.

1.12 ESCALATION

- A. All prices quoted must represent the entire cost in accordance with the Contract Documents and no subsequent claim will be recognized for any increase in wage scales, material prices, cost indexes, or any other rates affecting the construction industry or this project.

1.13 TAXES AND FREIGHT RATES

- A. Refer to the Owner's Invitation to Bid.
- B. Freight charges are to be included in bid.

1.14 WAGE RATES

- A. The Contractor is to comply with the requirements of Section 39S1 through 39S12, Chapter 48 of the Illinois Revised Statutes (1961) with reference to prevailing rates of wages he is to pay or cause to be paid not less than the prevailing rates of wages as found by the Owner or Department of Labor or as determined by the Court on Review to all laborers, workmen, and mechanics and is to employ only Illinois laborers on said project. Illinois Preference Act Action III.
- B. Comply with Federal Labor Standards, O.S.H.A. Regulations, and Equal Employment Requirements.

- C. The regulations of the above law are to be met by carrying out of the provisions of this Contract.

1.15 TIME FOR COMPLETION

- A. The Work is to commence at the time stated in the Contractor's Notice to Proceed or the Owner/Contractor Agreement and shall be completed on or before the times stated on the Bid Form.
- B. Such Notice to proceed may be given to the Contractor on any date after the Contractor has executed his Contract and furnished his Certificate of Insurance and Bonds to the Owner specified as required by the Owner.

1.16 SUBMISSION OF PROPOSALS

- A. Bids will be received at the time and place set forth in the Invitation To Bid. Bidders are responsible for delivery of their bids at or before the time and place so stated.
- B. Enclose bids and attachments in an opaque, sealed envelope addressed to the Owner. On the outside of the envelope shall appear the bidder's name and address. In the lower left hand corner, write or type the name of the project.

1.17 PUBLIC ACT 85-1295 (SB-2002)

- A. Public Act 85-1295 (BS 2002) which applies to this contract establishes criminal offenses relating to interference with public contracts and adds the following offenses to the Criminal Code of 1961 (Ill. Rev. Stat. 1987. ch. 38, new art. 33E):
 - 1. bid rigging (Sec. 33E-3)
 - 2. bid-rotating (Sec. 33E-4)
 - 3. acquisition or disclosure of
 - 4. bidding information by public official (Sec. 33E-5)
 - 5. interference with contract submission and award by public official (Sec. 33E-6)
 - 6. kickbacks (Sec. 33E-7)
 - 7. bribery of inspector employed by contractor (Sec. 33E-8)
 - 8. change orders (Sec. 33E-9)

1.18 PUBLIC ACT 86-799

- A. ILLINOIS DEPARTMENT OF LABOR PREVAILING FOR THE CITY OF DES PLAINES. Prevailing Wages are to be included in the contracts and their advertised specifications to which any public body, as defined in Section 2 of the Prevailing Wage Act (Ill. Rev. Stat. 1987, Ch. 48, par. 39s-1), is a party, for the construction, reconstruction, maintenance and/or repair of public buildings or public works within

the State of Illinois which requires or involves the employment of laborers, workers, and mechanics, and owner/operators.

- B. Minimum wages, overtime rate and fringe benefits certified herein shall be paid. This scale of prevailing wages to be paid shall be posted by the contractor in prominent and easily accessible place at the site of work. This determination is the property of Illinois Department of Labor and shall not be altered without their consent in writing.
- C. The Contract is to comply with the Illinois prevailing wage law, as amended from time to time. Not less than the prevailing rate of wages as found by Owner or the Illinois Department of Labor shall be paid to all laborers, workers and mechanics performing work under the Contract. If the Department of Labor revises the prevailing rate of wages to be paid laborers, workers or mechanics under the Contract, Owner will notify Contractor and each Subcontractor of the change in the prevailing rate of wages; provided, however, regardless of whether Owner gives such notice, the revised prevailing rate of wages shall apply to the Contract and Contractor shall have the sole responsibility and duty to pay, and ensure that all Subcontractors pay, the revised prevailing rate of wages to each person to whom a revised rate is applicable. Revision of prevailing wages shall not result in an increase in the Contract sum or other cost to Owner. Contractor shall indemnify, defend and hold Owner harmless from any loss, including but not limited to Owner's attorneys fees, resulting from Contractor's failure to comply with this prevailing wage clause. All bonds applicable to the Contract shall include a provision as will guarantee the faithful performance of the obligation to pay the prevailing rate of wages."

END OF DOCUMENT

DOCUMENT 00 41 13

BID FORM

TO: _____
(Name of Owner)

Attn.: _____

PROJECT: _____

FOR: _____
(Name of Facility)

FROM: _____
(Name of Bidder)

DATE: _____

REPRESENTATIONS

The undersigned, in compliance with the Invitation to Bid and Instructions to Bidders for the above referenced Project, having examined the Drawings and Specifications, together with the related Bidding Documents and all conditions surrounding the Work, and having visited the site of the proposed Work, hereby proposes to furnish all work in every detail in accordance with the Bidding Documents within the time set forth herein and at the prices stated below. These prices shall cover all expenses incurred in performing the Work under the Bidding Documents, of which this Bid is a part.

In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

- A. This Bid will remain subject to acceptance for 60 days after the day of the Bid opening;
- B. The Owner has the right to reject this Bid;
- C. Bidder will sign and submit the Agreement, along with the Performance Bond, Payment Bond, and Certificate of Insurance, within 10 days after the date of the Owner’s notice of award;
- D. Bidder has carefully examined copies of all the Bidding Documents;
- E. Bidder has visited the site and become familiar with the general, local, and site conditions;
- F. Bidder is familiar with federal, state, and local laws and regulations;
- G. The undersigned is an authorized representative of the Bidder;
- H. Bidder has correlated the information known to Bidder, information and

observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

- I. This Bid is genuine and not made in the interest of or on behalf of an undisclosed person, firm, or corporation and is not submitted in conformity with an agreement or rules of a group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited another Bidder to submit a false or sham Bid; Bidder has not solicited or induced another person, firm, or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself an advantage over another Bidder or over the Owner.

ADDENDA

The undersigned agrees that the following Addenda, which have been issued during the bidding period, have been received and have been considered both before and in the preparation of this Bid:

Addendum No. _____	Date: _____	Initial _____
Addendum No. _____	Date: _____	Initial _____
Addendum No. _____	Date: _____	Initial _____
Addendum No. _____	Date: _____	Initial _____
Addendum No. _____	Date: _____	Initial _____

BASE BID

Having examined the Drawings, Specifications, and all other Bidding Documents for _____ and having examined the premises and circumstances affecting the Work, the undersigned hereby presents the following offer:

OFFER: To furnish all labor, material, tools, equipment, transportation, bonds, all applicable taxes, incidentals, and other facilities, and to perform all Work for the total Base Bid amount of.

_____ Dollars
(in words)

(\$ _____).
(in figures)

(Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.)

ALLOWANCE

The undersigned hereby agrees that each Allowance submitted represents full compensation for either additions to or deductions from the Contract Sum in the event actual quantities of work in place differ from those indicated in the Contract Documents. Adjustments shall be made in accordance with applicable Division 01 - General Requirements Sections.

- A. ALLOWANCE NO. 1 – Lump Sum Allowance:
As indicated in Section 01 21 00 "Allowances." \$ _____

UNIT PRICES

The undersigned hereby agrees that each Unit Price submitted represents full compensation for either additions to or deductions from the Contract Sum in the event actual quantities of work in place differ from those indicated in the Contract Documents. Adjustments shall be made in accordance with applicable Division 01 - General Requirements Sections.

- B. UNIT PRICE NO. 1 – Water Vapor Emission Control System:
Synthetic Resin Polymer Treatment. ADD per square foot: \$ _____

- C. UNIT PRICE NO. 2 – Hydraulic Cement Based Underlayment:
ADD per square foot: \$ _____

COMPLETION DATE

The Undersigned, if notified of the acceptance of this Bid within sixty (60) days after the date set for the receipt of Bids, agrees to deliver the required Certificate of Insurance, Performance Bond in the amount of ONE HUNDRED PERCENT (100%) of the proposed Contract Sum for the faithful performance of the Work, and a ONE HUNDRED PERCENT (100%) Payment Bond, and to execute the Agreement within ten (10) days thereafter and, if approved by the Owner, agrees to enter into a contract for the Work for the above-stated Bid Sum.

The Bidder further agrees to begin Work on the Project within seven (7) days after receiving written Notice to Proceed by the Owner, and to achieve Substantial

Completion of the Work in not more than _____consecutive calendar days thereafter.
(To be filled in by Bidder)

This schedule of completion of the Work shall be considered of the essence of the contract, and the Work accordingly shall be substantially complete within the stipulated time, subject to extensions of time as provided in the General Conditions.

BID ACKNOWLEDGEMENT

The undersigned affirms that they are duly authorized to execute this Bid, that this company, corporation, firm, partnership, or individual has not prepared this Bid in collusion with any other bidder, and that the contents of this Bid as to prices, terms, or conditions of said Bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this Bid.

Bidder's authorized signature Date

Firm Name: _____

Address: _____

City: _____ State _____

Corporate Seal (if corporation):

Telephone: _____

Facsimile: _____

Email: _____

END OF DOCUMENT

DOCUMENT 00 52 13

FORM OF AGREEMENT

PART 1 - GENERAL

1.1 FORM OF AGREEMENT

- A. The "Standard Form of Agreement Between Owner and Contractor," AIA Document A101, 2017 edition, as published by the American Institute of Architects, will be the form of agreement between the Owner and Contractor. It is hereby referenced to same extent as if bound herein. A copy of AIA Document A101 is on file at the Architect's office.

PART 2 - NOT USED

PART 3 - NOT USED

END OF DOCUMENT

DOCUMENT 00 61 13

PERFORMANCE AND PAYMENT BONDS

PART 1 - GENERAL

1.1 PERFORMANCE AND PAYMENT BONDS

- A. The "Performance Bond and Payment Bond, AIA Document A312, 2010 Edition, as published by the American Institute of Architects, will be the form for performance and payment bonds. It is hereby referenced to same extent as if bound herein. A copy of AIA Document A312 is on file at the Architect's office.

PART 2 - NOT USED

PART 3 - NOT USED

END OF DOCUMENT

DOCUMENT 00 72 13

GENERAL CONDITIONS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

- A. The "General Conditions of the Contract," Pages one through forty four, inclusive, AIA Document No. A201-2017 as published by the American Institute of Architects, Article 1 thru 15, inclusive, is hereby made a part of the Contract Documents to same extent as if bound herein and as supplemented hereinafter. A copy of A201 is on file at the Architect's office.

PART 2 - NOT USED

PART 3 - NOT USED

END OF DOCUMENT

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project information.
- B. Contractor duties.
- C. Work by Owner.
- D. Future work.
- E. Access to site.
- F. Protection of persons, work, and property.
- G. Coordination with occupants.
- H. Work restrictions.
- I. Specification and Drawing conventions.

1.2 RELATED REQUIREMENTS

- A. 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: Oakton College - Adjacencies Renovations – Toilet Renovations,
1. Project Location: 1600 Golf Road, Des Plaines, Illinois 60016.
- B. Owner: Oakton College.
- C. Architect Identification: The Contract Documents were prepared for the Project by Perkins&Will, 410 N Michigan Ave, Suite 1600, Chicago, IL 60611; telephone 312-755-0770.
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents: 1. Mechanical, Electrical and Plumbing:

MECHANICAL SERVICES ASSOC. CORP.
11 S. VIRGINIA STREET
CRYSTAL LAKE, IL 60014

1.4 CONTRACTOR DUTIES

- C. VOC Compliance: Ensure that all assemblies, components, and systems comply with all VOC (Volatile Organic Components) requirements and regulations of the Environmental Protection Agency (EPA), Occupational Safety Health Administration (OSHA), State, County, City, and Local Air Control District.
 - 1. See Divisions 02 through 28 for Project VOC Restrictions.
- D. Except as specifically noted, provide and pay for:
 - 1. Labor, materials, and equipment.
 - 2. Tools, construction equipment and machinery.
 - 3. Water, heat, and utilities required for construction.
 - 4. Other facilities and services necessary for proper execution and completion of work.
- E. Secure and pay for, as necessary for proper execution and completion of Work, and as applicable at time of receipt of bids:
 - 1. Building Permit.
 - 2. Licenses.
- F. Give required notices.
- G. Comply with all applicable local Building Codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of Work.
- H. Promptly submit written notice to Architect of observed variance of Contract Documents from requirements of authorities having jurisdiction. Assume responsibility for Work known to be contrary to code or regulatory requirements performed without such notice.

1.5 ACCESS TO SITE

- I. 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 and by Owner's right to perform work or retain other contractors on portions of the project.
 - 1. During construction, allow for Owner occupancy and public use of, and access to, existing facilities.
 - 2. Make each entity engaged in work on the Project aware that the existing facilities house operating functions that must remain in operation during the construction period, except as the Owner may otherwise direct. Plumbing, heating, ventilating, electrical, fire alarm, and telephone systems are to be functional throughout the construction period with a minimum of interruptions in service. Do not block any required fire exits.
 - 3. Confine operations at Project site to areas permitted by law, ordinances, permits, and Contract Documents.
 - 4. Do not unreasonably encumber site with materials or equipment that hinders access.
 - 5. Protect and keep safe products stored on premises.
 - 6. Products and materials are to be stored to not interfere with operations of Owner or other contractors.

7. Obtain and pay for use of additional storage or work areas needed for operations.
- J. 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. Limit use of site for work and storage as follows:
 - a. Do not use completed paved areas for storage without Owner's approval.
 - b. Do not store materials within insert distance of new or existing trees.
 - c. Restrict Work and storage to areas indicated on Drawings or approved by Owner.
 - d. Limit site access to locations approved by Owner.
 - e. Restrict parking to areas approved by Owner.
 - f. Do not perform operations that would interrupt or delay Owner's daily operations.
 2. 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 onsite.
- K. 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.
- L. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.4 PROTECTION OF PERSONS, WORK, AND PROPERTY

- A. Contractor shall maintain adequate protection of the Work from damage and shall protect the Owner's and adjacent property from injury or loss arising from the Work.
 1. Repair damage to existing buildings, property, and site caused by employees, subcontractors, or consultants.
- B. Contractor shall provide and always maintain OSHA-required danger signs, guards, and obstructions necessary to protect the public and construction personnel from any dangers inherent with or created by the construction of the Work.
 1. Comply with federal, state, and city rules and requirements pertaining to safety, and all EPA standards, OSHA standards, and NESHAP regulations pertaining to asbestos and other hazardous materials.

1.5 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
 3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of 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. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 7 p.m., Monday through Friday, unless otherwise indicated.
1. Hours for Core Drilling and other noisy activities: Coordinate with Owner. Perform during hours when building is least occupied.
 2. Obtain approval from Owner for work outside of these hours.
- C. 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 Architect not less than two days in advance of proposed utility interruptions.
 2. Obtain Architect's written permission before proceeding with utility interruptions.

- D. 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 Architect not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Architect's written permission before proceeding with disruptive operations.
- E. Nonsmoking Property: Smoking is not permitted within the building or on Owner's property.
- F. Restricted Substances: Use alcohol, tobacco products, vaping devices, and other controlled substances within existing building and on Project site is not permitted.
- G. Employee Identification: Owner will provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. 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. Specifications Format: The Specifications are organized into Divisions and Sections using CSI/CSC's "MasterFormat 2020" 50-Division numbering system.
 - 1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence, without all numbers included in the sequence. Consult the Table of Contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
 - 2. The order of articles, paragraphs, subparagraphs, and sub-subparagraphs within the text of any Specification section is defined by a sequence of indentations.
 - a. Article, paragraph and subparagraph titles, and other identifications of subject matter in the Specifications, are intended as an aid in locating and recognizing various requirements in the beginning words of a sentence.
 - b. Specification text shall govern over titling and shall be understood to be interpreted as a whole. Where a title establishes the subject, the titles are subordinate to and do not define, limit, or otherwise restrict the Specification text.
 - 3. The captions and headings of various subdivisions of the Contract Documents are intended only as a matter of reference and convenience for describing the Work and in no way define, prescribe, or limit the scope or intent of the Contract Documents or any subdivision thereof.
- B. 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. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. 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.
 - b. Contract Documents may omit modifying words such as "all" or "any," and articles such as "the" or "an." The absence of a modifier or article from one statement that appears in another is not intended to affect the interpretation of either statement.
 3. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
 4. The Specifications do not:
 - a. Establish trade jurisdictions or divisions of responsibility.
 - b. Define subcontract scopes of work.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Work specified in any one Section is related to, and dependent upon, Work specified in other Sections, whether or not specific reference is made to the Work of other Sections. Cross-references in the Specifications are general references intended as a matter of convenience for aiding in the location general information and are not all-inclusive.
- E. Names, telephone numbers, and website addresses and other contact information listed in the Contract Documents are for convenience only, are subject to change, and are believed to be accurate and up to date as of the printing of the Contract Documents.
- F. Use of the word "including," when following any general statement, shall not be construed to limit such statement to specific items or matters listed, whether or not non-limiting language (such as "without limitation," "but not limited to," or other words of similar import) is used with reference thereto; but rather, shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement.
- G. 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.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 13 00

DELEGATED DESIGN REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for assemblies and construction systems provided by the Contractor as delegated design.

1.2 DEFINITIONS

- A. Delegated: Delegated by the Owner and Architect to the Contractor.
- B. Design: Planning, coordination, and graphic and written communication of a portion of the Work, including determination and engineering of system or assembly or system organization and structure, in response to functional requirements, arrangement and performance criteria indicated in the Contract Documents.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Portions of the Contract Documents delegate the design of certain components, assemblies or systems to the Contractor, or may otherwise specify "delegated design requirements" in individual specification Sections.
- B. Contractor is to be responsible for delegated design Work, including design, engineering and performance.
- C. Drawings of delegated design portions of Work are diagrammatic and are intended only to show:
 - 1. Design intent of finished materials, profiles, shapes and forms.
 - 2. Relationships between elements.
 - 3. Location, identification, dimension and size of components, assemblies and accessories.
 - 4. Schematic attachment details and diagrams of fasteners and connections.
- D. Specifications for delegated design portions of the Work establish performance criteria for materials, products, systems, and methods of execution, along with minimum performance requirements for indicated portions of the Work.
- E. Architect will review informational submittals specified herein to determine whether or not the delegated component, assembly or system design complies with the following:
 - 1. Contractor's engineering shows substantiation of the specified performance criteria.

2. Conforms to specified performance requirements, including those subsequent modifications.
 3. Complies with the overall project design.
 4. Can be appropriately integrated into the overall design of the project.
 5. Review by the Architect does not relieve the Contractor from compliance with the requirements of the delegated component.
- F. In the event of conflicts regarding the Contractor's proposed delegated design solutions and the design intent of the Contract Documents, the decision of the Architect will be final.

1.4 PROCEDURAL REQUIREMENTS

- A. Design Requirements: Proposed delegated design solutions are to demonstrate compliance with the original design intent of the Contract Documents, as determined by the Architect.
1. Unless otherwise defined by the Contract Documents, appearance of exposed elements, including member sizes, profiles and alignment of components, are to be within dimensional limits of section profiles indicated on the Drawings, and are to be consistent throughout the Project. Do not deviate from profiles, layouts or arrangements indicated without prior written approval from the Architect.
 2. Proposed delegated design solutions that exactly follow details indicated on the Drawings do not relieve Contractor of responsibility for design and performance of delegated design portions of Work.
- B. Engineering Requirements: Engineer delegated design portions of the Work to meet or exceed specified performance requirements, to satisfy the requirements of the authorities having jurisdiction, and to provide structurally sound, water and weathertight assemblies capable of withstanding the specified in-service loads without failure.
- C. Additional Requirements:
1. Fabricate, assemble and install delegated design portions of the Work to accommodate the full range of manufacturing, operating and field installation tolerances of adjacent work specified in other Sections.
 2. If required by the authorities having jurisdiction, submit shop drawings, specifications, calculations and other supporting data necessary for obtaining jurisdiction approval after they have been reviewed by the Architect and prior to beginning installation. Pay fees incurred.

1.5 INFORMATIONAL SUBMITTALS

- A. General: Coordinate and process submittals for delegated design portion of Work in same manner as for other portions of Work.
- B. Design Data:
1. Submit engineering calculations demonstrating compliance with the requirements of Contract Documents and of the authorities having jurisdiction.

- a. Provide calculations legible and that incorporate sufficient cross-references to shop drawings to make calculations readily understandable and reviewable.
- b. Test reports are not acceptable as a substitute for calculations.
2. Structural Calculations: Include the following:
 - a. Analysis of framing members.
 - b. Section property computations for framing members.
 - c. Analysis of anchors, including anchors embedded in concrete
 - d. Signature and seal of the qualified Engineer responsible for their preparation.
- C. Furnish appropriate certification from licensed fabricator shop or complete detailed inspection reports signed by each inspector performing unlicensed shop inspection to the Architect before the Work affected by these inspections is delivered to the site.

1.6 QUALITY ASSURANCE

- A. Engineer Qualifications: Unless stated otherwise in other sections, provide the following:
 1. Professional Engineer legally licensed and qualified to practice in the State of Insert state where project is located and experienced in and having a minimum of 10 consecutive years providing the type of engineering services indicated in the Contract Documents.
 2. Engineering services are defined as those performed for the design, fabrication and installation of components and assemblies similar in material, design, complexity and extent to those indicated in the Contract Documents for this Project.
- B. Fabricator/Installer Qualifications: Firm with a minimum of 10 consecutive years' experience in the design, testing, fabrication, assembly, installation and coordination of specified components, assemblies, and systems on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance. Submit evidence demonstrating the following:
 1. Ability to coordinate and work with a qualified testing agency for testing exterior building envelope assemblies utilizing the recognized test standards of the industry on projects similar in material, design, complexity and extent of this Project.
 2. Experience in managing, scheduling, coordinating, and maintaining on-time performance in conjunction with the successful projects and for the proposed project.
 3. An in-place, comprehensive quality assurance and quality control program and procedures that demonstrates how it is being applied on the project. Describe and demonstrate how the proposed comprehensive quality assurance and quality control program has been successful on other projects.
 4. Current resources, including currently employed personnel, to produce the Work to the specified requirements.

5. Ability to produce proposal drawings, accommodate plant visits, and mockups, organization plans, project management plans and proposed schedules in conjunction with the bidding for this Project.
6. Ability to warranty curtain wall systems for 5 years and the curtain wall finishes for 10 years.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide products, materials, components and accessories required for a complete installation and operation in the proposed design, whether or not such items are indicated in the Contract Documents.
- B. Provide anchors, attachments, hardware, inserts, fasteners, clips, bracing, framework, and similar items as required to meet specified design and performance requirements, and to anchor delegated design Work to adjacent supports, or to related adjoining work, whether or not such items are indicated in the Contract Documents.

PART 3 EXECUTION

3.1 DESIGN

- A. Unless otherwise indicated or specified, maintain design intent and specified performance requirements of the Contract Documents.
 1. If certain fabrication or erection methods, minor dimensional changes and detailing adjustments to the original design in the Contract Documents are required, indicate such on submitted Shop Drawings.
 2. Prior to shop drawing submittal, obtain written approval from the Architect for proposed changes and adjustments.
- B. Engage a qualified Engineer to design connection details and determine fastener types and sizes.
 1. Fasteners or connections are not to conflict with or require revision to the design profiles indicated on the Drawings or to the supporting work.
 2. Connections are not to impose eccentric loading, nor induce twisting or warping to supporting structure.
 3. Design connections to accommodate potential and actual misalignment of adjacent work within tolerances specified in other Sections.

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for the following:
 - 1. Lump-sum allowances.
 - 2. Testing and inspecting allowances.
 - 3. Payment and modification procedures related to allowances.

1.2 DEFINITIONS

- A. Allowance: An amount established in the contract documents to include in the total contract price intended to cover the cost of prescribed items that are not specified in enough detail.
- B. Allowance Expenditure Authorization (AEA): Form signed by Architect, Owner, and Contractor authorizing Contractor to proceed with a predetermined item of work, for an agreed-upon price.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed 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.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Informational Submittals:
 - 1. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
 - 2. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 TESTING AND INSPECTING ALLOWANCES

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.
- C. Costs of services not required by the Contract Documents are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.7 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 margins claimed.
 - 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. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. 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.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 01: Lump-Sum Allowance: Provide allowance for patching unused openings in existing partitions and floors. patch opening to match the composition of the partition or floor in which it is placed. This allowance includes material cost, receiving, handling, installation, and Contractor overhead and profit.

3.4 ATTACHMENTS

- A. Allowance Expenditure Authorization Form (AEA).

END OF SECTION

SECTION 01 22 00

UNIT PRICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

- A. Unit price as is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

- A. Unit prices include materials, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

- A. Refer to individual Sections of Specifications for the descriptions of units of work where the establishment of unit prices is required; the methods of measurement and pricing are specified therein.

3.2 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1 – Moisture Vapor Emission Control System: Refer to Section 09 05 61.13 - Moisture Vapor Emission Control.

1. Provide cost per square foot for complete system, including shot-blasting concrete substrate, application of penetrant, post-application moisture and alkalinity testing, application of cementitious underlayment, and manufacturer's 15-year warranty.
- B. Unit Price No. 2 - Cement-Based Underlayment: Refer to Section 03 54 16 - Cement-Based Underlayment.
 1. Provide cost per square foot for cement-based, polymer-modified, self-leveling underlayment for leveling of existing and new concrete flooring scheduled to receive finish flooring.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: 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. 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.

1.3 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. Acceptance of Alternates: Alternates will be reviewed and accepted or rejected at Owner's option. Execute accepted alternates under the same conditions as other work of the Contract.
 - 1. Owner Review Time: Provide 30 days for Owner review and decision of acceptance or rejection of Alternates.
- 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. Add Alternate No. 1 – Vestibule Renovation outside both bathroom blocks
 - 1. Base Bid: Vestibule renovation not included in base bid.
 - 2. Add Alternate: Add vestibule renovation to base bid.
 - 3. References:
 - a. Drawing: Sheets 10.A04-02, 10.A44-01, 10.A61-02
 - b. Specifications: 09 51 13 – Acoustical Panel Ceilings, 09 22 16 - Non Structural Metal Framing, 09 29 00 - Gypsum Board, 09 91 23 – Interior Painting, 09 30 13 – Tiling, 08 11 13 – Hollow Metal Doors and Frames.

END OF SECTION

SECTION 01 25 00
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for submitting and processing requests for product substitutions after the award of the construction contract.

1.2 RELATED REQUIREMENTS

- A. Section 01 26 00 - Contract Modification Procedures for determining which modification method and forms are appropriate.
- B. 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: Electronically submit a PDF copy 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 form provided by Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product, 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 model code organization acceptable to the authorities having jurisdiction.
 - 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.
- B. 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 through Construction Manager 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.
- 1. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - 2. Acceptance, if granted, will be based on reliance upon data submitted and the opinion, knowledge, information, and belief of the Architect at the time decision is rendered. Approval therefore is interim in nature and subject to reevaluation and reconsideration as additional data, materials, workmanship, and coordination with other work are observed and reviewed.
 - 3. In proposing items for consideration, Contractor assumes all risk, costs, and responsibility for item's final acceptance, compliance with Contract Documents, integration into the Work, and performance.

SUBSTITUTION PROCEDURES

4. 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.
- B. Substitution Request for products, assemblies, and equipment constitutes a representation that the Contractor:
 1. Has investigated the proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 2. Has confirmed that the proposed substitution does not affect dimensions or functional clearances.
 3. Agrees to provide the same warranty for the substitution as for the specified product.
 4. Agrees to coordinate installation and make changes to other work that may be required for no additional cost to the Owner.
 5. Waives claims for additional costs or time extension that may subsequently become apparent.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 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: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

1.8 ATTACHMENTS

- A. Post-Award Substitution Request Form.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SUBSTITUTION REQUEST FORM

(For use after Procurement phase)

TO: Perkins&Will
410 N. Michigan Ave., Suite 1600
Chicago, Illinois 60611

From: _____

Substitution Request No: _____ DATE: _____

Contractor hereby requests acceptance of the following product or system as a substitution in accordance with provisions of Division 01 Section "Substitution Procedures:"

PROJECT SPECIFICATION

Specification Name/Number: _____
Article, Paragraph, Page Number: _____
Item/System to be Substituted: _____

REASON FOR SUBSTITUTION REQUEST

SPECIFIED PRODUCT . . .

- Is no longer available.
- Is unable to meet project schedule.
- Is unsuitable for the designated application.
- Cannot interface with adjacent materials.
- Is not compatible with adjacent materials.
- Cannot provide the specified warranty.
- Cannot be constructed as indicated.
- Other: _____

PROPOSED PRODUCT . . .

- Will reduce the Contract Time by _____ days.
- Will reduce the Contract Sum by \$ _____.
- Is an Owner-initiated substitution

- Cannot be obtained due to one or more of the following:
 - Strike
 - Bankruptcy of manufacturer or supplier
 - Lockout
 - Similar occurrence

Explanation of each item marked above (attach documentation):

EFFECT OF SUBSTITUTION

Proposed substitution affects other work or trades: No Yes (if yes, explain)

Proposed substitution requires dimensional revisions or redesign of architectural, structural, mechanical, electrical, plumbing, life safety, or other work:

No Yes (if yes, attach data explaining revisions)

PRODUCT COMPARISON

Provide side-by-side comparison between proposed substitution and specified product to facilitate review of Substitution Request:

SPECIFIED PRODUCT:

PROPOSED PRODUCT:

Manufacturer: _____

Name / Brand: _____

Catalog No.: _____

Supplier: _____

Features: _____

Variations: _____

(Attach additional sheets if necessary)

(Attach additional sheets if necessary)

Local Distributor or Supplier: _____

Manufacturer's Representative: _____

Maintenance Service Available: Yes No

Spare Parts Source and Location: _____

Warranty Available is equivalent to the specified warranty: Yes No ____ Years

Describe any variation from specified warranty: _____

Product Manufacturing History New 2-5 yrs 6-10 yrs More than 10 yrs old

SUPPORTING DATA ATTACHED (REQUIRED WHERE APPLICABLE)

Point-by-point comparison of performance criteria, materials, and components of specified product with proposed substitution.

- | | | | |
|-----------------------------------|---|--|-----------------------------------|
| <input type="checkbox"/> Drawings | <input type="checkbox"/> Specifications | <input type="checkbox"/> Product Data | <input type="checkbox"/> Samples |
| <input type="checkbox"/> Tests | <input type="checkbox"/> Reports | <input type="checkbox"/> LEED Compliance | <input type="checkbox"/> Warranty |

REFERENCED INSTALLATIONS

Identify at least **three** similar local projects on which proposed substitution was used:

PROJECT #1:

Project: _____ **Date Installed:** _____

Address: _____

Owner: _____

Contact: _____ **Telephone:** _____

Architect: _____

Contact: _____ **Telephone:** _____

Contractor: _____

Contact: _____ **Telephone:** _____

PROJECT #2:

Project: _____ **Date Installed:** _____

Address: _____

Owner: _____

Contact: _____ **Telephone:** _____

Architect: _____

Contact: _____ **Telephone:** _____

Contractor: _____

Contact: _____ **Telephone:** _____

PROJECT #3:

Project: _____ **Date Installed:** _____

Oakton Adjacencies - Toilet Renovations
Des Plaines and Skokie , IL
Issue for Bid

Perkins&Will
021075.001
09 June 2025

Address: _____

Owner: _____

Contact: _____ Telephone: _____

Architect: _____

Contact: _____ Telephone: _____

Contractor: _____

Contact: _____ Telephone: _____

ACKNOWLEDGEMENTS: The undersigned certify that:

Performance: Proposed substitution has been fully investigated and determined to be equal or superior in all respects to the specified product, including appearance, quality, performance, code compliance, and sustainability compliance.

Warranty: Same warranty will be furnished for proposed substitution as for specified product.

LEED Compliance (LEED projects only): Same contribution to LEED program.

Operations and Maintenance: Same maintenance service and source of replacement parts, as applicable, are available locally for the proposed substitution.

No Adverse Effect: Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.

No Adverse Time or Cost: Cost data and time as stated above are complete. Contractor bears all costs for labor and materials associated with fully integrating proposed substitution into the Project. Claims for additional costs or time related to accepted substitution which may subsequently become apparent are waived.

Payment will be made to the Owner for changes to the project design, including Architect's and Engineer's redesign fees and engineering, detailing, special inspection, and construction costs incurred by the Owner caused by acceptance of the substitution.

Coordination necessary to fully integrate the proposed substitution, and any associated modifications to related or adjacent Work, have been or will be performed.

Dimensions and Clearances: Proposed substitution does not affect dimensions or functional clearances.

Conditions of Acceptance: The Architect's recommendation for approval, if granted, relies on data submitted and the opinion and knowledge of the Architect at the time decision is rendered. The approval is conditional in nature and subject to reevaluation and reconsideration if additional data or materials are submitted, or coordination with other work is observed to invalidate claims that substitution is equal to item originally specified.

Contractor: _____

(Name of Contractor)

Date: _____ By: _____

Subcontractor: _____

(Name of Subcontractor)

Date: _____ By: _____

Note: Substitution requests are not part of the standard submittal process and shall not be submitted as part of Shop Drawings, Product Data, or Samples submittals. Substitution requests must be filled out completely. Unresponsive or incomplete requests will be rejected and returned without review.

ARCHITECT'S REVIEW AND ACTION

- Substitution acceptance is recommended.
- Substitution acceptance is recommended, with the following comments: _____

- Architect's additional services proposal attached.
- Resubmit Substitution Request:
 - Provide the following: _____
 - Provide proposal indicating amount of savings / credit to Owner
- Substitution acceptance is not recommended:
 - Substitution Request received too late.
 - Substitution Request received directly from subcontractor or supplier.
 - Substitution Request not submitted in accordance with requirements.
 - Substitution Request Form is not properly executed.
 - Substitution Request does not indicate what item is being proposed.
 - Insufficient information submitted to facilitate proper evaluation.
 - Proposed product does not appear to comply with specified requirements.
 - Design Team has no experience with product / manufacturer and is therefore unable to comment on the track record of quality, performance, or reliability.
 - Proposed product will require substantial revisions to Contract Documents.

PERKINS&WILL

Oakton Adjacencies - Toilet Renovations
Des Plaines and Skokie , IL
Issue for Bid

Perkins&Will
021075.001
09 June 2025

Perkins&Will acknowledges its reliance upon information provided by the Contractor, and makes no claim as to the accuracy, completeness, or validity of such information. If an accepted substitution is later found to not comply with requirements of the Contract Documents, the Contractor shall be solely responsible for performance of the work in accordance with requirements of the Contract Documents.

By: _____ Date: _____

OWNER'S REVIEW AND ACTION

- Substitution is accepted; Architect to prepare Change Order.
- Substitution is not accepted.

By accepting this substitution, Owner agrees to compensate Perkins&Will for additional services, if any, necessary to implement the substitution.

Additional Services: \$_____

By: _____ Date: _____

(Owner's Representative)

END OF FORM

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for handling and processing Contract modifications.

1.2 RELATED REQUIREMENTS

- A. Section 01 25 00 - Substitution Procedures for administrative procedures for handling requests for substitutions made after the Contract award.
- B. Section 01 31 00 - Project Management and Coordination for administrative procedures for handling RFIs.

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 substantially similar form generated by the Architect.

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. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Contractor's Action: Within 10 days 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. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - b. Include separate costs of labor, materials, equipment and supervision directly attributable to the change.
 - c. 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.

- d. Quotation Form: Use form 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 separate costs of labor, materials, equipment 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 form acceptable to Architect.

1.5 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.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. 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.

Oakton Adjacencies - Toilet Renovations
Des Plaines and Skokie , IL
Issue for Bid

Perkins&Will
021075.001
09 June 2025

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 DEFINITIONS

- A. Schedule of Values: 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.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's Construction Schedule.
 - 1. Coordinate line items in the schedule of values with 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.
- 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.
 - 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. 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 that covers items stored at a bonded warehouse, and during transport to the project site.
4. Provide separate line items in the Schedule of Values for each part of the Work where Applications for Payment may include cost of submittals.
 - a. Cost for submittals shall represent true cost of submittals preparation, as evidenced by subcontractor invoices, but not to exceed 5 percent of the total value of that item of work line item.
5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
6. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
7. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.4 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 paid for by Owner.
- B. Payment Application Times: The date for each progress payment is the 20th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 15 days before the date for each progress payment.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
 1. Other Application for Payment forms proposed by the Contractor shall be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.
- 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.

PAYMENT PROCEDURES

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. 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.
- F. Transmittal: Submit PDF of Application for Payment to Architect within 24 hours. Include waivers of lien and similar attachments if required.
1. Provide transmittal form listing attachments and recording appropriate information about application.
- G. 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. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Preparation and Submittal of Draft of Initial Application for Payment (Pencil Copy):
1. Prepare draft copy of Application for Payment and meet with Owner and Architect to review the draft copy prior to submittal of the Application for Payment.

2. Provide four (4) draft (pencil) copies within two (2) business days before the day of the review meeting with Owner and Architect. Submit substantiating data with each application copy: subcontractor applications for payment, copies of invoices, storage receipts, and data required by Owner
 3. After review of draft (pencil) copy by Owner, Architect, and Contractor, prepare Application for Payment, using agreed-upon data on Owner/Architect-reviewed schedule of values and Owner/Architect-reviewed pencil draft.
 4. Include specified information required for application preparation.
- 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. Copy of executed Agreement between Owner and Contractor.
 2. List of subcontractors.
 3. Schedule of values.
 4. Contractor's construction schedule (preliminary if not final).
 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. Payment Applications During Construction: Submit changes in submittals schedule, construction schedule, and other schedules with each application for payment.
- K. 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.
- L. 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. Evidence that claims have been settled.

5. 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.
6. Final liquidated damages settlement statement.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. 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. Digital project information management.
 - 5. Project meetings.

1.2 RELATED REQUIREMENTS

- A. Section 01 32 00 - Construction Progress Documentation for preparing and submitting Contractor's construction schedule.
- B. Section 01 73 00 - Execution for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
- C. Section 01 77 00 - Closeout Procedures for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request from Owner, Architect, or Contractor seeking information required for clarifications of the Contract Documents.
- C. PIMS: Web-based Project Information Management System managed by the Contractor and for use by Owner, Owner's Consultants, Architect and Architect's Consultants.

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, telephone number, and email address 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.
 4. Post list on PIMS and always keep current.
- 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 PIMS and in prominent location in built facility. Always keep list current.
- C. Administrative and Personnel: In addition to Project superintendent, identify other administrative and supervisory personnel as required for proper performance of the Work. Identify individuals and their duties and responsibilities; list their addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
1. Include personnel required for coordination of operations with other contractors.

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.
 4. Where availability of space is limited, coordinate installation of components to ensure maximum performance and accessibility for required maintenance, service, and repair of components, including mechanical and electrical.
- B. 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.
- C. Conservation: Coordinate construction activities to ensure operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

- A. Coordination Meetings: Conduct coordination meetings with subcontractors. Owner and Architect may or may not be present at such meetings.
 - 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 time a minimum of three days prior to the meeting date.
- B. 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.
- C. 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 suitable modifications and resubmit.
- D. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 - 1. File Preparation and Submittal Format: Same digital data software program, version, and operating system as original Drawings.
 - 2. BIM File Incorporation: Develop and incorporate coordination drawing files into BIM established for Project.
 - a. Perform three-dimensional component conflict analysis as part of the preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification for design requirements by Architect.
 - 3. 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. Contractor shall execute a data licensing agreement in the form of Electronic File Transfer Agreement included in this Project Manual or a Digital Execution Plan agreed to by the Owner, Contractor and Architect.

1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarifications or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Contractor shall submit RFIs to Architect using PIMS.
 - 2. Architect shall provide Contractor with a list of design team contacts by discipline for RFI distribution.
 - 3. Concurrent with submission to the Architect, Contractor shall also distribute RFIs to appropriate design team professionals, using PIMS, based on the disciplines affected by the RFI.

4. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 5. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
 6. Include only one subject or item per RFI. RFIs that include more than one subject or item will be returned without review to the Contractor.
- B. Contractor's failure to report discrepancies or omissions in the Contract Documents, or Contractor- or Subcontractor-generated assumptions, in lieu of Architect-issued clarifications regarding the intent of the Contract Documents, shall not be used as a basis for future claims once the apparent discrepancies or omissions have been reconciled by appropriate interpretation issued by the Architect.
- C. 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. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject or item.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. 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.
- D. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- E. RFI Submission Procedure:
1. Post electronic submittals as PDF electronic files directly to the Contractor's PIMS as described below.
- F. Architect's Action: Architect will review each RFI, determine action required, and respond as indicated in the project General Conditions. Allow seven working days for Architect's response for each RFI.
1. RFIs received by Architect after 1:00 p.m. in Architect's time zone will be considered as received the following working day.

2. Where the due date for an action or response occurs on a Saturday, Sunday, or legal holiday, such action or response shall be considered due on the next day that is not a Saturday, Sunday, or legal holiday.
 3. The following RFIs will be returned without action:
 - a. RFIs addressing more than one subject or item.
 - b. Requests for approval of submittals.
 - c. Requests for approval of substitutions.
 - d. Requests for approval of Contractor's means and methods.
 - e. Requests for approval of nonconforming Work.
 - f. Requests for coordination information already indicated in the Contract Documents.
 - g. Requests for adjustments in the Contract Time or the Contract Sum.
 - h. Requests for interpretation of Architect's actions on submittals.
 - i. Incomplete RFIs or inaccurately prepared RFIs.
 4. Architect's action may include a request for additional information, in which case Architect's time for response will begin at the time of receipt by Architect of additional information.
 5. RFIs involving requests for recommendations or design assistance on how to address remediation or correction of nonconforming work are not eligible for an increase in Contract Sum or an extension of Contract Time, regardless of when the RFIs are returned, or the corrective action proposed therein.
 6. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 - Contract Modification Procedures.
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
 - 1) If Contractor's notification is submitted more than 21 days after receipt of the RFI response, any work resulting from the RFI response is not eligible for an increase in Contract Sum or an extension of Contract Time.
 7. In the event Contractor requests an accelerated RFI review and response by Architect, Architect will endeavor to accommodate Contractor's request. However, any such desired accelerated review times shall not supersede the requirements of the Contract, and no extension of Contract Time will be authorized because of Architect's failure or inability to adhere to Contractor's desired accelerated review times.
 8. Architect will return a response to the RFI via the PIMS.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date the RFI response is due.
 8. List of parties the RFI was distributed to.

9. Date Architect's response was received.
 10. Date the RFI was closed by the Contractor.
 11. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- H. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT INFORMATION MANAGEMENT

- A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 3. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.
- B. Web-Based Project Information System (PIMS): Provide, administer, and use web-based Project software for purposes of hosting and managing Project communication and documentation until Final Completion.
1. PIMS shall be similar to Procore, Ebuilder, Autodesk Construction Cloud or Plangrid but shall include, at a minimum, the following features:
 - a. Project Directory, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creating and distributing meeting minutes.
 - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - k. Management of construction progress photographs.
 - l. Mobile device compatibility, including smartphones and tablets.

- m. Creating and exporting editable logs for all PIMS functions including, but not limited to: RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders. Owner, Architect and Architect's Consultants shall have rights and ability to download logs at any time.
2. Provide up to 20 user licenses for use of Owner, Owner's Commissioning Authority, Architect, and Architect's Consultants. Provide eight hours of software training at Architect's office for web-based Project software users.
3. At completion of Project, change of PIMS or end of Owner-Contractor Contract, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.

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 time a minimum of 3 days prior to the meeting date.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees using PIMS.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes using PIMS to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: 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, Owner's Commissioning Authority, Architect, Architect's consultants, Contractor, Contractor's 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 but not limited to the following:
 - a. Tentative construction schedule.
 - b. Critical work sequencing and long-lead items.
 - c. Designation of key personnel and their duties.
 - d. Lines of communications.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.

- k. Digital Execution Plan and associated procedures.
 - l. Preparation of record documents.
 - m. Use of the premises 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. Parking availability.
 - u. Office, work, and storage areas.
 - v. Equipment deliveries and priorities.
 - w. First aid.
 - x. Security.
 - y. Progress cleaning.
 - z. Special procedural, inspection and submittal requirements of the Authorities Having Jurisdiction.
4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes using PIMS.
- C. Digital Execution Conference: Schedule and conduct a digital execution conference before starting construction, at a time convenient to Owner Architect, and Contractor.
- 1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, Architect's consultants, Contractor, Contractor's 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.
 - 2. Agenda: Discuss items of significance that could affect the exchange of digital information, including but not limited to the following:
 - a. Electronic file transfer requirements and protocols.
 - b. Right of reliance on Architect's and Architect's Consultants digital files.
 - c. Schedule of digital file transfers and periodic updates.
 - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes using PIMS.
- D. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity as indicated in individual Sections.
- 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 and Owner's Commissioning Authority 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 using PIMS.
 - 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.
- E. 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, Owner's Commissioning Authority, Architect, Architect's consultants, Contractor, Contractor's 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 but not limited to 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. Owner's partial occupancy requirements.
 - k. Installation of Owner's furniture, fixtures, and equipment.
 - l. Responsibility for removing temporary facilities and controls.
 - m. Close of PIMS and export of data to Owner and Architect.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes using PIMS.
- F. 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, Owner's Commissioning Authority, 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 using PIMS.
 - 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.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Construction schedule updating reports.
 - 3. Reports:
 - a. Daily construction reports.
 - b. Material location reports.
 - c. Site condition reports.
 - d. Special reports.

1.2 RELATED REQUIREMENTS:

- A. Section 01 29 00 - Payment Procedures for submitting the Schedule of Values.
- B. Section 01 31 00 - Project Management and Coordination for submitting and distributing meeting and conference minutes.
- C. Section 01 32 33 - Photographic Documentation for submitting construction photographs.
- D. Section 01 33 00 - Submittal Procedures for submitting schedules and reports.
- E. 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. 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.

- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. 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.
- F. Major Area: A story of construction, a separate building, a separate wing, a major department, or a similar significant construction element.
- G. Milestone: A key or critical point in time for reference or measurement.
- H. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.4 INFORMATIONAL SUBMITTALS

- A. Submittals Format: Reference Section 01 33 00 - Submittal Procedures for requirements.
- B. Submittal Schedule: Arrange the following information in a tabular format:
 - 1. Specification Section number and title.
 - 2. Submittal category (action or informational).
 - 3. Name of subcontractor.
 - 4. Description of the Work covered.
 - 5. Scheduled date for first submittal.
 - 6. Date of submission.
 - 7. Scheduled date for Architect and Owner's final release or approval.
 - 8. Fabrication and delivery time frame.
 - 9. Required on job date.
 - 10. Approval date.
- C. 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. Include type of schedule (initial or updated) and date on label.
- D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, 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 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 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 activities sorted in ascending order of total float.
- E. Construction Schedule Updating Reports: Submit with Applications for Payment.
- F. Daily Construction Reports: Submit at weekly intervals.
- G. Material Location Reports: Submit as required with monthly payment application.
- H. Site Condition Reports: Submit immediately at time of discovery of differing conditions.
- I. Special Reports: Submit at time of unusual event.

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 Contractor's construction schedule, including, but not limited to, the following:
1. Review format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy.
 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 submittal schedule, progress reports, 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 SUBMITTAL SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for initial review, at least one resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.
- B. Restrictions and Limitations:
 - 1. Submittal review and processing times listed in Section 01 33 00 - Submittal Procedures shall be considered baselines and shall take precedence over any lesser times promulgated by Contractor in the Submittal Schedule or Construction Schedule.
 - 2. No delay claim will be entertained, and no extension of the Contract Time will be authorized due to Contractor's failure to transmit submittals enough in advance of the Work to permit proper and reasonable processing.
 - 3. If the Contractor fails to submit a Submittal Schedule or fails to provide submittals in accordance with the approved 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.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion and final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an earlier or later 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. 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.
 - 2. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect and Owner.
 - 3. 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.

4. 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.
 5. Startup and Testing Time: Include time as required by Owner for startup and testing. Startup and Testing must be completed by Substantial Completion.
 6. Substantial Completion: Indicate date established for Substantial Completion. Allow time for Architect and Owner's administrative procedures necessary for certification of Substantial Completion.
 7. Punch List and Final Completion: Include time as required by Owner for completion of punch list items and final completion.
 8. 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.
- 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. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 2. 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.
 3. 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.
 4. 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.
 5. 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.

6. 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.
- 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. Substantial Completion.
- E. Upcoming Work Summary/Look-Ahead Schedule: 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.
- F. 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.
- G. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using the Critical Path Method.
- 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 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 30 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 and Owner's approval of the schedule.
 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

- D. CPM Schedule Preparation: Prepare a list of 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. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and commissioning.
 - j. Punch list and final completion.
 - k. Activities occurring following final completion.
 2. 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.
 3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
- E. Contract Modifications: For each proposed contract modification, if applicable and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare 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.
- 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.

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.
 20. Construction photographs with descriptions.
- 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 in accordance with RFI provisions of Section 01 31 00 - Project Management and Coordination. 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 immediately. 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 with application for payment.
 - 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.
- B. Distribution: Distribute copies of approved schedule to Architect and Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

END OF SECTION

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for the following:
 - 1. Construction photographs.
 - 2. Construction video recordings.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Construction photographs may not be used for Contractor's marketing materials or social media unless approved by Owner.

1.3 INFORMATIONAL SUBMITTALS

- A. Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Submit photos electronically. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name of Contractor.
 - c. Date photograph was taken.
 - d. Description of location, vantage point, and direction.
 - e. Unique sequential identifier keyed to accompanying key plan.
- B. Video Recordings: Submit video recordings within seven days of recording.
 - 1. Submit video recordings electronically. Include copy of key plan indicating each video's location and direction.
 - 2. Identification: With each submittal, provide the following information in file metadata tag:
 - a. Name of Project.
 - b. Name of Contractor.
 - c. Date video recording was recorded.
 - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1.4 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format. Photographs should be clear, free from obstruction with appropriate lighting, and easily viewable.

- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1.5 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take photographs of existing buildings either on or adjoining property, to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- C. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
- D. Periodic Construction Photographs: Take photographs at weekly intervals coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.
- F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
 - 1. Three days' notice will be given, where feasible.
 - 2. In emergency situations, take additional photographs within 24 hours of request.

1.6 CONSTRUCTION VIDEO RECORDINGS

- A. Preconstruction Video Recording: Before starting demolition and construction, record video recording of Project site and surrounding properties from different vantage points, as directed by Architect.
 - 1. Flag construction limits before recording construction video recordings.
 - 2. Show existing conditions adjacent to Project site before starting the Work.
 - 3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of demolition and construction.

4. Show protection efforts by Contractor.
- B. Periodic Construction Video Recordings: Record video recording monthly and coinciding with the cutoff date associated with each Application for payment. Select vantage points to show status of construction and progress since last video recordings were recorded. Minimum recording time shall be 30 minutes(s).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

1.2 RELATED REQUIREMENTS:

- A. Section 01 31 00 - Project Management and Coordination; for submitting RFIs, issuing meeting minutes, and submitting Coordination Drawings requirements.
- B. Section 01 31 06 - Coordination Drawings for coordination drawing requirements.
- C. Section 01 32 00 - Construction Progress Documentation for submitting schedules and reports, including Contractor's Construction Schedule.
- D. Section 01 40 00 - Quality Requirements for submitting test and inspection reports.
- E. Section 01 77 00 - Closeout Procedures for submitting warranties.
- F. Section 01 78 23 - Operation and Maintenance Data for submitting operation and maintenance manuals.
- G. Section 01 78 39 - Project Record Documents for submitting record Drawings, record Specifications, and record Product Data.
- H. Section 01 79 00 - Demonstration and Training for submitting video recordings of demonstration of equipment and training of Owner's personnel.
- I. Division 02 – 33 Specification Sections for submittal requirements specific to the Sections.

1.3 DEFINITIONS

- A. Submittals: Written and graphic information and physical samples sent to the Architect for confirmation of the Project design.
- B. Project Information Management System (PIMS): Web-based Project Information Management System managed by the Contractor and for use by Owner, Owner's Consultants, Architect and Architect's Consultants.
- C. 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 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. 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 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.
- B. 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 10 business 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. Resubmittal Review: Allow 10 business days for review of each resubmittal.
- C. 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 a unique identifier:
 - a. Specification number with no spaces followed by a period.
 - b. Three-digit sequential number followed by a period.
 - c. Two-digit revision number followed by a dash. An initial submittal will use 00 for the revision number.
 - d. Two-character Type Identifier followed by a dash.
 - 1) CT for certificate.
 - 2) IN for informational submittal.
 - 3) PD for product data.
 - 4) QL for qualification information.
 - 5) SA for samples.
 - 6) SD for shop drawing.
 - 7) TR for test report.
 - e. Short description of the content, using material designation indicated in the Contract Documents where present.
 - f. Example: 084413.001.00-SD-Curtain Wall CW-1.pdf

3. Use submittal schedule to permanently record Contractor's review and approval markings and action taken by Architect and Owner.
 4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software acceptable to Owner.
- D. Options: Identify options requiring selection by the Architect and Owner.
- E. Deviations: Identify deviations from the Contract Documents on submittals.
1. Clearly identify deviations from the Contract Documents by clouding or other suitable means acceptable to Architect and Owner.
 - a. Provide accompanying detailed written explanation for each deviation.
 - b. Provide the corresponding specification Section labeled with compliance and non-compliance.
- F. 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.
- G. 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.
- H. Use for Construction: Use only final 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. Submit electronic submittals to Architect and Owner using PIMS.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 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.
 3. Test and Inspection Reports Submittals: Comply with requirements specified in Section 01 40 00 - Quality Requirements.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

SUBMITTAL PROCEDURES

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. Equipment dimensional drawings.
 - b. Wiring diagrams showing factory-installed wiring.
 - c. Printed performance curves.
 - d. Operational range diagrams.
 - e. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data concurrent with Samples.
- 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, unless submittal based upon Architect's digital data drawing files is otherwise permitted.
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.
- 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.
 3. Number and title of applicable Specification Section.
 4. Number of Samples: Submit samples as required in individual Specification Sections.

5. Disposition: When possible, 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 responsibility of Contractor.
- E. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 - Project Management and Coordination.
- F. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00 - Construction Progress Documentation.
- G. Application for Payment: Comply with requirements specified in Section 01 29 00 - Payment Procedures.
- H. 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.
- I. 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 American Welding Society (AWS) forms. Include names of firms and personnel certified.
- J. 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.
- K. 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.
- L. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- M. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- N. 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.
- O. Product Test Reports: Submit written reports indicating 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.

- P. 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.
- Q. 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.
- R. Field Test Reports: Submit 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.
- S. Maintenance Data: Comply with requirements specified in Section 01 78 23 - Operation and Maintenance Data.
- T. 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 files 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. Provide delegated-design drawings to Owner in electronic format.

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: Refer to 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, as follows:
 - 1. Final Unrestricted Release: When the Architect marks a submittal:
 - a. A - NO EXCEPTIONS
 - b. The Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When the Architect marks a submittal:
 - a. B - EXCEPTIONS AS NOTED
 - b. The Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance. Resubmittal is not required for this action.
 - 3. Returned for Resubmittal: When the Architect marks a submittal:
 - a. C - REVISE AND RESUBMIT
 - b. Do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 - c. Do not use, or allow others to use, submittals marked "C- REVISE AND RESUBMIT" at the Project Site or elsewhere where Work is in progress.
 - 4. Returned as Rejected: When the Architect marks a submittal:
 - a. D - REJECTED
 - b. Do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. The submittal does not conform to the design concept or meet requirements of the Contract Documents.

- c. Do not use, or allow others to use, submittals marked "D – REJECTED" at the Project Site or elsewhere where Work is in progress.
 5. Returned as received for Information Only: When the Architect marks a submittal:
 - a. E – FOR INFORMATION ONLY
 - b. Proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. The submittal is acceptable, but the Architect’s affirmative action is not required.
 6. Returned as Not Reviewed: When the Architect marks a submittal:
 - a. F - NOT REVIEWED
 - b. Submittal is not required by the Contract Documents.
- B. Submittals are reviewed for conformance with the design concept expressed in the Contract Documents. Review is not for the purpose of confirming or approving:
 1. Deviation from the Contract Documents, including but not limited to deviation with reference to material, quantity, location, quality, dimension, or orientation (except as expressly annotated in writing by the Architect herein).
 2. Means, methods, sequences, or techniques of construction (unless expressly called for in the Contract Documents and herein expressly highlighted for review and approval by the Architect).
 3. Safety of the Contractor(s) work, work plan, procedures, workers or of the site.
 4. Any clarification of a patent or latent ambiguity or defect in the Contract Documents.
 5. Procurement or request for any labor, materials or other expense of the contractor(s) which is in addition to that previously approved by the Owner.
- C. Contractor shall be and shall remain responsible for:
 1. Compliance with the Contract Documents.
 2. Coordination of the Work (including amongst various trades).
 3. Performing the Work in a safe and satisfactory manner.
 4. Confirming and correlating quantity and dimensions.
 5. Construction schedule.
- D. 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.
- E. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- F. Incomplete submittals are not acceptable, will be considered non-responsive, and will be returned without review.
- G. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

3.3 ATTACHMENTS

- A. Appendix A – Electronic Drawing File Transfer Agreement Form (BIM).

Oakton Adjacencies - Toilet Renovations
Des Plaines and Skokie , IL
Issue for Bid

Perkins&Will
021075.001
09 June 2025

B. Appendix B – Electronic Drawing File Transfer Agreement Form (CAD).

END OF SECTION

Electronic File Transfer Agreement (Contractor – BIM Files)

Name	Date:	[Publish Date]
Address	Project Name:	Oakton Colleae Adiacencies Toilet Renovations
Description of Data:	PW Project No:	021075.001

The undersigned is a contractor (the “Contractor”) performing services and/or directly or indirectly providing goods and material related to the subject project (the “Project”). The undersigned hereby requests that Perkins&Will and its consultants provide electronic files prepared by Perkins&Will and its consultants for the Project in the form of an electronic model (the “Model Files”). The undersigned acknowledges and agrees that Perkins&Will has no contractual obligation, or any other obligation, to provide the Model Files to the contractor. Perkins&Will agrees to provide the Model Files in consideration for the undertakings of the undersigned. The undersigned agrees that the Contract Documents that Perkins&Will is contractually obligated to prepare and/or deliver are hardcopy drawings and specifications only. The undersigned additionally agrees that the Model Files are not Contract Documents (as that term is defined in or understood to mean in the Owner-Contractor Agreement), do not represent Contract Document modifications, and are not intended to be a substitute for or a supplement to the hardcopy drawings and specifications, or to necessarily represent actual physical conditions on the Project site.

Model Files to be furnished include work prepared by Perkins&Will and its consultant(s) only. The Model Files were prepared by Perkins&Will using the Autodesk® Revit® software platform. Model Files will be furnished in that software platform’s standard format without modifications for the Contractor’s convenience. One set of electronic Model Files will be furnished to the Contractor. The Contractor assumes responsibility for distributing pertinent files to the subcontractors.

The undersigned agrees that the request to provide the Model Files is purely for the convenience of the undersigned and does not constitute the rendering of professional services. Perkins&Will has prepared the Model Files to facilitate the production of the Contract Documents, which are reasonably accurate and complete to the extent of the standard of professional care. The undersigned acknowledges that Perkins&Will does not represent the furnished Model Files as being accurate or complete, as being suitable for the Contractor’s purpose, or as identifying or containing any issue, anomaly, omission, or concern with reference to the Project.

The undersigned agrees and understands that the Model Files, except as expressly set forth above, are not fit for any particular purpose, including but not limited to quantity take-offs; pricing; clash detection; ascertainment of construction or installation tolerances and clearances; preparation of shop drawings, coordination drawings, or fabrication drawings; construction sequencing; or the manufacture of any building component or system. As such, the Model Files, and the information contained in them, and the information that may have been omitted from them, shall not be used as a basis for an increase in the Contract Sum or Contract Time.

The undersigned acknowledges that the Model Files have not necessarily been developed with the assistance or specific expertise of the individual subcontractors and installers, and therefore do not account for or

Perkins&Will

incorporate means and methods required by individual subcontractors for their scope of the finished Work. Modifications to the information about the components included in the Model Files may be required and are the responsibility of the Contractor to ascertain, coordinate, and implement. All such modifications are part of the scope of Work of this Project and shall be provided at no additional cost to Owner.

The undersigned further acknowledges that Perkins&Will has made no representations to the undersigned that the Model Files are suitable for any purpose other than as expressly set forth above, or will be usable by the undersigned's systems, infrastructure, or software. The undersigned also understands and agrees that the Model Files may be subject to anomalies, errors, viruses, malware, or other unintended defects, and that Perkins&Will has not reviewed or determined whether such defects may be present in any electronic files. Use of these electronic files is solely at the risk of the undersigned.

The undersigned agrees to release any and all claims that they may have at any time against Perkins&Will or its consultants arising out of the use of the Model Files by the undersigned or by any other individual or entity. The undersigned agrees to hold harmless and indemnify Perkins&Will and its consultants from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees arising from or in any way connected with the provision of the Model Files by Perkins&Will or the use, modification, misinterpretation, misuse, or reuse by others of the Model Files provided by Perkins&Will. The undersigned shall not use, modify, or reproduce any of the Model Files without first removing identifying information for Perkins&Will and its consultants that may be incorporated in the furnished Model Files.

The undersigned confirms that it will use the Model Files only with reference to the Project and shall not copy or distribute the Model Files, or permit the Model Files to be copied or distributed by others, except for use on this Project. The undersigned shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms and conditions of this Agreement, and to assume toward the Contractor all the obligations and responsibilities that the Contractor, by this Agreement, assumes toward the Owner and Perkins&Will. The undersigned Contractor assumes responsibility for the breach of this Agreement by any Subcontractor to whom the Contractor distributes the Model Files.

Upon return receipt of this signed Agreement, the Model Files will be transmitted to the undersigned through electronic mail, or be posted on the Perkins&Will file transfer protocol site or the Project web site.

This Agreement may be executed in counterpart, and the parties agree that the individual counterparts, taken together, shall constitute a binding agreement.

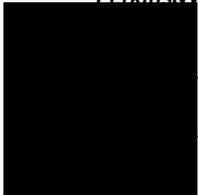
The undersigned agrees that they are authorized to bind the company indicated below to the obligations of this Agreement, and understands that Perkins&Will is relying upon this representation in agreeing to enter into this Agreement. In addition to any rights that Perkins&Will may have against the company, the undersigned agrees that Perkins&Will shall have rights personally against the undersigned if this apparent authority is questioned or disputed by the company in any way.

The undersigned agrees that any violation of this Agreement by the undersigned or the company, or any of the agents, representatives, officers, or employees of either, will result in irreparable harm to Perkins&Will that cannot be entirely compensated by money damages. Therefore, the undersigned and the company agree that Perkins&Will may seek any and all equitable remedies that may be available to Perkins&Will, including but not limited to a temporary or permanent injunction in the event of any breach or threatened breach of the terms of this Agreement.

The undersigned shall reimburse Perkins&Will for any cost or expense, including attorney's fees and all labor and expenses (including those of in-house counsel), related to the enforcement of the terms of this Agreement.

Perkins&Will

Perkins&Will



Title

Date

Acknowledged and Accepted

Name

Company

Title

END OF AGREEMENT

Perkins&Will

Electronic File Transfer Agreement (Third Party – CAD Files)

Name	Date:
Address	Project Name: Oakton College Adjacencies Renovations – Toilet Renovations
Description of Data: Architectural CAD File	Project No: 021075.001

The **undersigned** is not a party to an agreement for professional services provided by Perkins&Will, by itself or through its employees and officers, but has been engaged as an outside consultant (the “Consultant”) by the Owner to perform ancillary consulting services and for use in preparation of documents related to the above-referenced Project (hereinafter the “**Project**”), subject to these terms and conditions. The undersigned hereby requests that Perkins&Will, and its consultants if applicable, provide graphic drawing information prepared by Perkins&Will and its consultants for the Project in the form of Electronic Files. The **undersigned** acknowledges and agrees that Perkins&Will has no contractual obligation to provide the Electronic Files to the “Consultant.” Perkins&Will agrees to provide the Electronic Files, however, in consideration for the undertakings of the undersigned herein.

Electronic Files to be furnished include work prepared by the Architect only but may – in certain circumstances – also include Files for work prepared by the M-E-P consultant and structural consultant. Electronic Files will be furnished in .dwf file format only. Only one set of Electronic Files will be furnished; Consultant assumes responsibility for distributing pertinent files to the Consultant’s employees and various sub-consultants.

The **undersigned** agrees that the request to provide the Electronic Files is purely for the convenience of the Consultant and does not constitute the rendering of professional services. Whereas Perkins&Will has prepared the Electronic Files to facilitate the production of Deliverables, which are reasonably accurate and complete to the extent of the standard of professional care applicable to the Deliverables, the **undersigned** acknowledges that Perkins&Will has not and will not otherwise review the furnished Electronic Files to determine if they are accurate or complete, are suitable for the Consultant’s purpose, or if they identify or contain any issue, anomaly, omission, or concern with reference to the **Project**.

The **undersigned** agrees and understands that the Electronic Files, except as expressly set forth above, are not fit for any particular purpose, including, but not limited to quantity take-offs; pricing; clash detection; ascertainment of construction or installation tolerances and clearances; preparation of shop drawings, coordination drawings, or fabrication drawings; construction sequencing; or the manufacture of any building component or system. As such, the Electronic Files, or the information contained therein or which may have been omitted there from with respect to the content of the Contract Documents, shall not be used as a basis for a claim against the Architect or any of its consultants.

The **undersigned** acknowledges that the Electronic Files have been developed without the assistance or specific expertise of the individual sub-consultants and installers, and therefore do not account for or incorporate means, methods, shop standards, and routing economies required by individual sub-Consultants for the scope of work required by the finished Work. Modifications to the information and routings of the selected components included in the Electronic Files may be required and are the responsibility of the Consultant to ascertain, coordinate, and implement.

The **undersigned** further acknowledges that Perkins&Will has made no representations to the undersigned that the Electronic Files are suitable for any purpose other than as expressly set forth above, or will be usable by the **undersigned's** systems, infrastructure, or software. The **undersigned** also understands and agrees that the Electronic Files may be subject to anomalies, errors, viruses, malware, or other unintended defects, and that Perkins&Will has not reviewed or determined whether or not any such defects may be present in any Electronic Files. Use of these Electronic Files is solely at the risk of the **undersigned**.

The **undersigned** agrees to release any and all claims that they may have at any time against Perkins&Will and its consultants arising out of the use of the Electronic Files by the **undersigned** or any other individual or entity. The **undersigned** agrees to hold harmless and indemnify Perkins&Will and their consultants from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees, arising out of or in any way connected with the provision of the Electronic Files by Perkins&Will or the use, modification, misinterpretation, misuse, or reuse by others of the Electronic Files provided by Perkins&Will. The **undersigned** shall not use, modify or reproduce any of the Electronic Files without first removing any identifying information, if any, for Perkins&Will and their consultants, on the files or incorporated in or into the Files.

The **undersigned** confirms that it will only use the Electronic Files with reference to the **Project** and shall not permit the Files to be copied or distributed, except for use on this **Project**.

Upon return receipt of this signed Agreement the Electronic Files will be transmitted to the **undersigned** via courier, electronic mail, or posted on the Perkins&Will file transfer protocol site or project web site.

This Agreement may be executed in counterpart, and the parties agree that the individual counterparts, taken together, shall constitute a binding agreement.

The **undersigned** agrees that they are authorized to bind the company indicated below to the obligations of this Agreement and understands that Perkins&Will is relying upon this representation in agreeing to enter into this Agreement. In addition to any rights that Perkins&Will may have against the company, the **undersigned** agrees that Perkins&Will shall have rights personally against the **undersigned** if this apparent authority is questioned or disputed by the company in any way.

The **undersigned** agrees that any violation of this Agreement by the **undersigned** or the company, or any of the agents, representatives, officers or employees of either will result in irreparable harm to Perkins&Will which cannot be entirely compensated via money damages. Therefore, the **undersigned** and the company agree that Perkins&Will may seek any and all equitable remedies that may be available to Perkins&Will, including, but not limited to a temporary or permanent injunction in the event of any breach or threatened breach of the terms of this Agreement.

The ***undersigned*** shall reimburse Perkins&Will for any cost or expense, including attorney's fees, labor and expenses (including those of in-house counsel) related to the enforcement of the terms of this Agreement.

ACKNOWLEDGED AND ACCEPTED:

Third Party (*The Consultant*)

Third Party:

Printed Name

Signature of Recipient

Title

Company

Date

END OF AGREEMENT

SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Special procedures for alteration work including the following:
 - 1. Products and installation for patching and extending Work within construction areas of existing facilities.
 - 2. Providing transition and adjustments.
 - 3. Repair of damaged surfaces and finishes.

1.2 DEFINITIONS

- A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- B. Consolidate: To strengthen loose or deteriorated materials in place.
- C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
- D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.
- J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- K. Retain: To keep existing items that are not to be removed or dismantled.

- L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 OCCUPANCY, ACCESS, AND PROTECTION

- A. Entire facility will be occupied during progress of construction for conduct of normal operations.
 - 1. Phase Work in accordance with Section 01 10 00 - Summary.
- B. Normal business hours for facility are generally from 8:00 AM through 5:00 PM, seven days a week.
- C. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage. Perform work not to interfere with operations of occupied areas.
- D. Existing facilities will remain in full operation during execution of this Work. Exercise every precaution to ensure safety and protection for existing facilities, occupants, merchandise, pedestrians, and vehicles.
 - 1. Maintain safe access and egress at all times for occupants, pedestrians, and vehicles.
 - 2. Maintain exiting from facilities to provide safe passage complying with applicable codes.

1.4 COORDINATION

- A. Make arrangements with Owner and schedule Work to avoid interference with normal operations of occupied areas. Submit schedule and summary of applicable Work within occupied areas and obtain Owner approval not less than two days prior to commencement of such Work.
 - 1. Requests for use of certain existing loading docks, passageways, and other similar spaces within areas outside limits of construction operations will be limited to day-by-day basis and must be approved in advance by Owner.
- B. Coordinate access and scheduling of Work within tenant areas with Owner.
 - 1. Schedule construction operations in sequence required to obtain best Work results.
 - 2. Coordinate sequence of alteration work activities to accommodate the following:
 - a. Owner's continuing occupancy of portions of existing building.
 - b. Owner's partial occupancy of completed Work.
 - c. Other known work in progress.
 - d. Tests and inspections.
 - 3. Detail sequence of alteration work, with start and end dates.
 - 4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
 - 5. Use of elevator and stairs.
 - 6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use in existing structure. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.

1.5 PROJECT MEETINGS FOR ALTERATION WORK

- A. Preliminary Conference for Alteration Work: Before starting alteration work, conduct conference at Project site.
1. Attendees: In addition to representatives of Owner, Construction Manager, Architect, Contractor, Owner's insurer, testing service representative, specialists, and chemical-cleaner manufacturer(s) shall be represented at the meeting.
 2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:
 - a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Fire-prevention plan.
 - c. Governing regulations.
 - d. Areas where existing construction is to remain and the required protection.
 - e. Hauling routes.
 - f. Sequence of alteration work operations.
 - g. Storage, protection, and accounting for salvaged and specially fabricated items.
 - h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
 - i. Qualifications of personnel assigned to alteration work and assigned duties.
 - j. Requirements for extent and quality of work, tolerances, and required clearances.
 - k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.
 3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.
- B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals. 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, Architect, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
 2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.

- a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
 - b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:
 - 1) Interface requirements of alteration work with other Project Work.
 - 2) Status of submittals for alteration work.
 - 3) Access to alteration work locations.
 - 4) Effectiveness of fire-prevention plan.
 - 5) Quality and work standards of alteration work.
 - 6) Change Orders for alteration work.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.
 1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed.

1.7 INFORMATIONAL SUBMITTALS

- A. Alteration Work Subschedule:
 1. Submit alteration work subschedule within seven days of date established for commencement of alteration work.
- B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.
- C. Alteration Work Program: Submit 30 days before work begins.
- D. Fire-Prevention Plan: Submit 30 days before work begins.

1.8 QUALITY ASSURANCE

- A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.
 - 1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
 - a. Construct new mockups of required work whenever a supervisor is replaced.
- B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.
 - 1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
 - 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.
- D. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.9 STORAGE AND HANDLING OF SALVAGED MATERIALS

- A. Salvaged Materials:
 - 1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
 - 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
- B. Salvaged Materials for Reinstallation:
 - 1. Repair and clean items for reuse as indicated.
 - 2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label 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 unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.
- C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.
- D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.
 1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
 2. Secure stored materials to protect from theft.
 3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F (3 deg C) or more above the dew point.
- E. Storage Space:
 1. Owner will arrange for limited on-site location(s) for free storage of salvaged material. This storage space includes security and climate control for stored material.
 2. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.10 FIELD CONDITIONS

- A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of measured drawings, preconstruction photographs, and preconstruction videotapes.
 1. Comply with requirements specified in Section 01 32 33 - Photographic Documentation.
- B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- C. Owner's Removals: Before beginning alteration work, verify in correspondence with Owner that the following items have been removed:
 1. _____.
- D. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.

1.11 KEYS

- A. When necessary to perform Work, Owner will issue keys to existing mechanical/electrical equipment spaces.

- B. Return keys at end of each work day; request keys on succeeding days, if necessary.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Type and Quality of Existing Products: Use products or types of construction that exist in structure, as needed to patch, extend, or match existing Work.
 - 1. Generally, Contract Documents do not define products or standards of workmanship present in existing construction.
 - 2. Determine by inspecting and testing products where necessary, referring to existing work as quality standard.
- B. New Materials: Comply with Specifications for each product involved.
 - 1. Match existing products and work for patching existing work.
- C. Materials for Temporary Fire-Rated Partitions: Comply with provisions of Section 01 50 00 - Temporary Facilities and Controls.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Discrepancies: Verify dimensions and elevations indicated in layout of existing work.
 - 1. Prior to commencing work, carefully compare and check Contract Documents for discrepancies in locations or elevations of work to be executed.
 - 2. Refer discrepancies among Drawings and existing conditions to Architect for adjustment before work affected is performed.
 - 3. Existing conditions concealed behind accessible ceilings which are contrary to anticipated or proposed conditions, shall not be used as a basis for change order requests. Existing conditions behind in-accessible ceilings may be used as a basis for change order requests, provided it can be documented that there was no way conditions could be verified.

3.2 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
 - 1. Use only proven protection methods, appropriate to each area and surface being protected.
 - 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
 - 3. Erect temporary barriers to form and maintain fire-egress routes.
 - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.

5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
 6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
 7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
 8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.
- B. Temporary Protection of Materials to Remain:
1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
 2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.
- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
- D. Utility and Communications Services:
1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.
- E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.
1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
- F. Existing Roofing: Prior to the start of work in an area, install roofing protection, as indicated on Drawings.

3.3 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:
1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled "Owner's Responsibility for Fire Protection."
 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.
 - a. If combustible material cannot be removed, provide fire blankets to cover such materials.

- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:
1. Obtain Owner's approval for operations involving use of open-flame or welding or other high-heat equipment. Use of open-flame equipment is not permitted. Notify Owner at least 72 hours before each occurrence, indicating location of such work.
 2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
 4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
 5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
 6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:
 - a. Train each fire watch in the proper operation of fire-control equipment and alarms.
 - b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
 - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
 - d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
 - e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.
- C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.
- D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.
1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.4 PROTECTION DURING APPLICATION OF CHEMICALS

- A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.
- B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.
- C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
- D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.
- E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.5 GENERAL ALTERATION WORK

- A. Have specialty work performed only by qualified specialists.
- B. Ensure that supervisory personnel are present when work begins and during its progress.
- C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs or video recordings. Comply with requirements in Section 01 32 33 - Photographic Documentation.
- D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
- E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
 - 1. Do not proceed with the work in question until directed by Architect.

3.6 INSTALLATION

- A. Coordinate Work of alterations and renovations to expedite completion and to accommodate Owner occupancy.
- B. Remove, cut, and patch Work in manner to minimize damage and to provide means of restoring products and finishes to specified condition.
 - 1. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.

- C. Install products as specified in individual Specification sections.
- D. Where new Work abuts or aligns with existing, perform smooth and even transition to match existing adjacent surface in texture and appearance.
 - 1. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and request instructions from Architect as to method of making transition.

3.7 FINISHES

- A. Finish new surfaces as specified in individual Specification sections.
- B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.8 ADJUSTMENTS

- A. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to provide smooth plane without breaks, steps, or soffits.
- B. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- C. Fit Work at penetrations of surfaces as specified in Section 01 73 00 - Execution.

3.9 CLEANING

- A. Comply with Section 01 73 00 - Execution. Thoroughly clean areas and spaces affected by Work. Completely remove paint, mortar, oils, putty and items of similar nature.
- B. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection 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 quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect and Owner or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.2 RELATED REQUIREMENTS:

- A. Divisions 02 through 33 Sections for specific test and inspection requirements.

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. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.
- 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. 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).
- H. 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. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is 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 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.

1.6 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 submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, 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, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award, 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 personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
- C. 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.
- D. 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.

1.8 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, telephone number, and email address 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 of 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, telephone number, and email address 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 of 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.

1.9 QUALITY ASSURANCE

- A. 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- 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. Where required by individual Specification Sections, Installer employing workers trained and approved by manufacturer, Installer being acceptable to manufacturer, and/or Installer being an authorized representative of manufacturer for both installation and maintenance.
- 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 is similar in material, design, and extent to those indicated for this Project.
- F. **Specialists:** Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
 - 1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. **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.
- H. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **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. When testing is complete, remove assemblies; do not reuse materials on Project.
 - 2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.10 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 inspection 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, whether specified or not, to verify and document that the Work complies with requirements.
 - 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 inspection 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 inspection 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. 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.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.
 - 1. Distribution: Distribute schedule to Owner, Architect, and testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

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 and Authorities Having Jurisdiction reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, 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

SECTION 01 42 00

REFERENCES

PART 1 GENERAL

1.1 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, without any implied meaning extending the Architect's responsibility into the Contractor's area of Contractor coordination, supervision, or means and methods of construction as outlined in the Conditions of the Contract.
 - 1. In no situation will an approval by Architect release Contractor from responsibility to fulfill requirements of the Contract Documents.
- C. "Authorities Having Jurisdiction" (AHJ): Means the agencies, either individually or collectively, charged by statute with administration and enforcement of the requirements of building codes and other regulations at the Project location.
- D. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- E. "General Requirements":
 - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions (if any) and other Division 01 General Requirement Sections, apply to all sections of the work.
 - 2. The provisions or requirements of Division 01 Sections apply to entire Work of the Contract and where so indicated, to other elements which are included in the Project.
- F. "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."
- G. "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.
- H. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- I. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

REFERENCES

- J. "Provide": Furnish and install, complete and ready for the intended use.
- K. "Installer": Means the Contractor or other entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor to perform a particular construction operation at the Project site, including preparation, erection, installation, application, construction, re-installation, and similar operations required for execution of the Work.
 - 1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 2. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
- L. "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.

1.2 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.

1.3 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 indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Conflicting Requirements: Where 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 uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

REFERENCES

1. 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.
2. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements for temporary utilities, support facilities, and security and protection of facilities.

1.2 RELATED REQUIREMENTS

- A. 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. 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, backflow preventers, and extensions of services as required for construction operations.
- C. 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 SUBMITTALS

- A. Informational Submittals:
 - 1. Implementation and Termination Schedule: Within 15 days of date established from commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
 - 2. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, tpestyles, graphic elements, and message content.
 - 3. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

4. 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:
 - a. Locations of dust-control partitions at each phase of work.
 - b. HVAC system isolation schematic drawing.
 - c. Location of proposed air-filtration system discharge.
 - d. Waste handling procedures.
 - e. Other dust-control measures.
5. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by the Owner. Include the following:
 - a. Methods used to meet the goals and requirements of the Owner.
 - b. Concrete cutting method(s) to be used.
 - c. Location of construction devices on the site.
 - d. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
 - e. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with the Owner.
 - f. Indicate Locations of sensitive research, patient, and equipment areas or other areas requiring special attention as identified by Owner. Indicate means for complying with Owner's requirements.

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. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines, State Accessibility Code, Local Accessibility Code, 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. Lumber and Plywood: Comply with requirements in Section 06 10 53 - Miscellaneous Carpentry.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) 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 (914 by 1624 mm).
- D. Paint: Comply with requirements in Sections 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting.
- E. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- 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.
- D. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- E. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities 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.

3.2 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.

3.3 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. 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.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

- D. 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.
- E. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- F. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
 - 1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
 - 2. Provide warning signs at power outlets other than 110 to 120 V.
 - 3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
 - 4. Provide metal conduit enclosures or boxes for wiring devices.
 - 5. Provide 4-gang outlets, spaced so 100-foot (30-m) extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.
- G. 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.
- H. Electronic Communication Service: Provide temporary electronic communication service in common-use facilities.
 - 1. Provide broadband in primary field office.
 - 2. Provide for connection of communication devices by Owner, Architect, and Contractor by Wi-Fi, or wired connections.

3.4 SUPPORT FACILITIES INSTALLATION

- A. Parking: Provide temporary parking areas for construction personnel.
- B. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 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.
- C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 - Execution.
- D. 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.
- E. 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.
- F. 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.

3.5 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.
 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- 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. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Coordinate and provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- F. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Construct dustproof partitions with two layers of 6-mil (0.14-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.14-mm) polyethylene sheet, extending sheets 18 inches (460 mm) 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 (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.
 - 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 4. Insulate partitions to control noise transmission to occupied areas.
 - 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 6. Protect air-handling equipment.
 - 7. Provide walk-off mats at each entrance through temporary partition.
- G. Temporary Fire-Rated Partitions: Erect and maintain dustproof fire-rated partitions and temporary enclosures to limit dust and dirt migration and to separate occupied areas from construction, fumes, and noise. Fire-rated partitions shall be provided to separate existing occupied areas from construction areas in accordance with NFPA 241
 - 1. Construct fire-rated dustproof partitions of not less than nominal 4-inch (100-mm) studs, 1/2-inch (13-mm) or 5/8-inch (16 mm) Type X gypsum wallboard on both sides, with joints taped.
 - 2. Extend partitions up to underside of existing structure to the greatest extent possible.
 - 3. Insulate partitions to provide noise protection to occupied areas.
 - 4. Seal joints and perimeter with fire-resistant joint sealant.
 - 5. Equip partitions with dustproof doors and security locks.
 - a. Protect openings in 1-hour fire-rated partitions with 45-minute hollow metal or solid core wood doors.
 - 6. Protect air-handling equipment.
 - 7. Weatherstrip openings.
- H. 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. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - a. Field Offices: Class A stored-pressure water-type extinguishers.
 - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
 - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
6. Develop and supervise an overall fire-prevention and first-aid fire-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.
7. Prohibit smoking in construction areas.
8. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
9. 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.
10. 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.

3.6 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.

3.7 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. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. 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

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. 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.

1.2 RELATED REQUIREMENTS

- A. Document 00 26 00 "Procurement Substitution Procedures" for requests for substitutions during bidding / procurement period.
- B. Section 01 25 00 - Substitution Procedures for requests for substitutions after bid /pricing.
- C. 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 single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of products for purposes of evaluating comparable products.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

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. Identification of basis-of-design product, fabrication, or installation method to be replaced, including Specification Section number and title, and Drawing numbers and titles.
- B. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 - Submittal Procedures. Show compliance with requirements.
- D. Substitution: Refer to Section 01 25 00 - Substitution Procedures for definition and limitations on substitutions.

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. Each Contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between Contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 COORDINATION

- A. Coordinate affected Work as necessary to integrate work of approved comparable products and approved substitutions.

1.7 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. Provide a secure location and enclosure at Project site, at location approved by Owner for storage of materials and equipment.
 2. Store products to allow for inspection and measurement of quantity or counting of units.
 3. Store materials in a manner that will not endanger Project structure.
 4. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 5. Store cementitious products and materials on elevated platforms.
 6. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 7. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 8. Protect stored products from damage and liquids from freezing.
 9. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.8 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. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. 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.

1.9 PROHIBITION ON INCORPORATION OF HAZARDOUS MATERIALS

- A. Contractor is responsible for ascertaining that materials within the existing facility, which will be disturbed as part of the work, are free of asbestos containing materials and for performing surveys and/or providing certifications attesting regarding this.
- B. Architect and its consultants have not knowingly specified for incorporation into the work, materials or products containing hazardous materials or toxic substances (including asbestos).
- C. Contractor (including its subcontractors, sub-subcontractors, and material suppliers/fabricators under its control) is prohibited from incorporating any material or products into the work containing hazardous materials or toxic substances.
- D. As part of completed materials and products list required herein, Contractor shall assemble, for the Owner's records, the Material Safety Data Sheets (MSDS) for all materials and products incorporated into the work. These MSD sheets shall be updated upon final completion of the work to incorporate changes which have occurred during the course of the work due to approved substitution requests and other modifications. Architect will not review, nor approve, the MSD sheets. The Contractor, also as a pre-requisite to achieving final completion, shall provide a certificate to the Owner indicating that no hazardous or toxic materials or products were incorporated into the work.

- E. Architect and its consultants are not responsible for the presence of hazardous materials or toxic substances in or around the work, nor the exposure to persons who construct or subsequently occupy the work. The Architect will not provide certifications regarding the presence or absence of such materials or substances.

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.
- 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.
 - a. Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
 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.
 - a. Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
 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 be considered unless otherwise indicated.
 - 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.

- 1) Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
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 be considered unless otherwise indicated.
 - 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.
 - 1) Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
5. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
6. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer.
 - a. Submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
7. 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.
 - a. Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
- 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.
1. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
 2. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.
 3. Full Industry Range: Where Specifications include the phrase "full industry range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from any listed manufacturer's product line that includes both standard and premium items.
 4. "Custom Color as selected by Architect" or "to match color on file in Architect's office", "match Architect's sample" means that the color selected is custom and requires custom formulations and submissions of color to obtain Architect's approval prior to application.

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.
- B. Submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.

PART 3 EXECUTION (NOT USED)

END OF SECTION

PRODUCT REQUIREMENTS

SECTION 01 73 00

EXECUTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Installation of the Work.
 - 2. Coordination of Owner-installed products.
 - 3. Progress cleaning.
 - 4. Starting and adjusting.
 - 5. Protection of installed construction.

1.2 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary for limits on use of Project site.
- B. Section 01 33 00 - Submittal Procedures for submitting surveys.
- C. Section 01 73 29 - Cutting and Patching.
- D. Section 02 41 19 - Selective 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. 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. 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. Examination of the Site and Records of Existing Construction and Conditions: Examine the site, the records of existing construction, and the conditions under which the Work is to be performed. Notify the Architect immediately if existing conditions discovered will affect the Work as shown on the Contract Documents
- B. Existing Conditions Depicted in the Contract Documents: The Contract Documents are based upon the information furnished to the Architect by the Owner. Such information is available from the Owner. The records are furnished for information only and may not represent all conditions that will be encountered. The records of existing construction represent conditions known to the Owner. Other construction, of which no records are available, may be encountered. Dimensions of existing construction are based on information provided to the Architect by the Owner. The Contractor and each subcontractor shall field verify dimensions of existing conditions.
- C. 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.
- D. 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.

- E. 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 local utility 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 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 (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.
- B. Precautions Against Movement or Settlement: The Contractor shall take precautions, including bracing, shoring, underpinning, or other retaining structures, to guard against movement or settlement of existing or new construction. Assume responsibility for the design, safety, and support of such construction, and for movement, settlement, damage, or injury resulting from the construction.
- C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- E. 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.

- F. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- G. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- H. 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.
- I. 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.
- J. 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.
- K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 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.

3.5 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 (27 deg C).
 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.

3.6 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 - Quality Requirements.

3.7 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

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General administrative and procedural requirements for cutting and patching.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.
- C. Cutting and patching is performed for coordination of the Work, to uncover Work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.
- D. Restoring or removing and replacing non-complying work is specified separately from cutting-and-patching but may require cutting-and-patching operations as specified herein.

1.3 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
 - 1. Coordinate with Owner if Cutting and Patching Conference will be required.
 - 2. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.
 - c. Trade supervisor(s) responsible for patching of each type of substrate.
 - d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.
 - 3. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.4 SUBMITTALS

- A. 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. Coordinate with Owner if Cutting and Patching Plan will be required.
 2. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 3. 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.
 4. Products: List products to be used for patching and firms or entities that will perform patching work.
 5. Dates: Indicate when cutting and patching will be performed.
 6. 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.

1.5 QUALITY ASSURANCE

- A. Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, 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.
 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.
 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.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

- A. 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 Owner and Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Materials to be cut and patched include those damaged by the performance of the Work.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. 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.
- B. Temporary Support: Provide temporary support of Work to be cut.
- C. Protection: Protect existing 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.
- D. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- E. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

- A. 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. 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.
- C. 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, as judged by Architect. 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 eliminate evidence of patching and refinishing.
 - 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, corner to corner of wall and edge to edge of ceiling. 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.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. 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.

1.2 RELATED REQUIREMENTS

- A. Section 01 31 00 - Project Management and Coordination for Web-based Project Information Management System.
- B. Section 01 73 00 - Execution for progress cleaning of Project site.
- C. Section 01 78 23 - Operation and Maintenance Data for operation and maintenance manual requirements.
- D. Section 01 78 39 - Project Record Documents for submitting record Drawings, record Specifications, and record Product Data.
- E. Section 01 79 00 - Demonstration and Training for requirements for instructing Owner's personnel.
- F. Divisions 03 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. List of Incomplete Items: Contractor prepared list of items to be completed or corrected, prepared for the Architect's use prior to Owner, Owner's Agent, and Architect's inspection (Design Team Punchlist), to determine if the Work is substantially complete.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For cleaning agents.
 - 2. Contractor's List of Incomplete Items: Initial submittal at time of request for Substantial Completion Inspection.

3. Certified List of Incomplete Items: Final submittal at Final Completion.
- B. Closeout Submittals:
 1. Certificates of Release: From authorities having jurisdiction.
 2. Certificate of Insurance: For continuing coverage.
 3. Field Report: For pest control inspection.
- C. Maintenance Material Submittals:
 1. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. "Substantial Completion" is the stage in the progress of Work when Work or designated portion thereof is sufficiently complete in accordance with Contract Documents so Owner can occupy or utilize Work for use which it is intended.
 1. Work will not be considered suitable for Substantial Completion review until all systems and equipment are operational; all designated or required governmental inspections and certifications have been made and posted, designated instruction of Owner's personnel in operation of systems and equipment has been completed, operation and maintenance data has been satisfactorily turned over to the Owner, and all finishes are in place. In general, the only remaining Work shall be minor in nature, such that the Owner could occupy project or designated portion thereof on following day, and completion of Work by Contractor would not materially interfere or hamper Owner's normal business operations.
 2. Contractor shall certify that all remaining Work will be completed within a reasonable time, agreed upon by Owner, following date of Substantial Completion. Failure of the Contractor to complete the Work within the stipulated time shall automatically re-institute the provisions for liquidated damages due Owner as contained elsewhere in Contract Documents, or as provided by law for such period of time as may be required by Contractor to fully complete Work whether Owner has occupied the Project or not.
- B. Contractor's List of Incomplete Items: Using Web-based Project Information Management Systems, 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.
- C. 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.
 - a. Texas Accessibility Standards (TAS) inspection.
 - b. Accessibility standard inspection for compliance with ANSI A117.1, Americans with Disabilities Act Accessibility Guidelines (ADAAG) and local requirements if more stringent.

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 Architect. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
 5. Submit test/adjust/balance records.
 6. Submit sustainable design submittals required in Section 01 81 13 - Sustainable Design Requirements and in individual Sections not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- D. 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. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
 7. Advise Owner of changeover in heat and other utilities.
 8. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 10. Complete final cleaning requirements, including touchup painting.
 11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

- E. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request and the Contractor's list of incomplete items, Architect will 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.

1.6 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, Architect will 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.

1.7 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. Use CSI Form 14.1A or substantially similar form, and forward to Architect at time of request for Substantial Completion inspection. Architect may use same form for Architect's supplemental items to Contractor.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and 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.

CLOSEOUT PROCEDURES

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. PDF electronic file. Architect will return annotated file.

1.8 ACCESSIBILITY STANDARD INSPECTION

- A. Provide inspection at Substantial Completion of facility in accordance with rules and regulation of the Texas Department of Licensing and Regulations (TDLR) for the purpose of determining compliance with the Texas Accessibility Standards. Inspector must be licensed with the Texas Department of Licensing and Regulations to perform the required inspection.
- B. Upon receipt of Inspector's report, immediately make corrections of any reported non-compliant items. Provide documentation to Owner of completed corrective measures.

1.9 ACCESSIBILITY STANDARD INSPECTION

- A. Provide inspection at Substantial Completion of facility in accordance with rules and regulations of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for the purpose of determining compliance with ADAAG. Inspector must be licensed with the state fire marshal to perform the required inspection.
- B. Upon receipt of Inspector's report, immediately make corrections of any reported non-compliant items. Provide documentation to Owner of completed corrective measures.

1.10 OPERATION AND MAINTENANCE MANUALS

- A. Refer to Section 01 78 23 - Operation and Maintenance Data.

1.11 PROJECT RECORD DOCUMENTS

- A. Refer to Section 01 78 39 - Project Record Documents.

1.12 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. 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.

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. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 - Temporary Facilities and Controls."

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 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

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency procedures manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.

1.2 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.

1.3 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 comments and prior to commencing demonstration and training.

1.4 COORDINATION

- A. Where operation and maintenance documentation include information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

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 PROCEDURES 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 AND MAINTENANCE 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.

Oakton Adjacencies - Toilet Renovations
Des Plaines and Skokie , IL
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09 June 2025

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Digital Data Files.
 - 3. Record Specifications.
 - 4. Record Product Data.
 - 5. Miscellaneous record submittals.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Initial Submittal:
 - a. Submit PDF electronic files of Contractor's marked-up record documents.
 - b. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - 2. Final Submittal:
 - a. Submit PDF electronic files of scanned record documents.
 - b. Print each drawing, whether or not changes and additional information were recorded.
 - 3. Final Submittal:
 - a. Submit record digital data files.
 - b. Plot each drawing file, 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.

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

- A. Maintain a marked-up copy of Contract Drawings and Shop Drawings, incorporating new items and revisions as modifications are issued.
1. Preparation: Mark record documents 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 documents.
 - 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 documents 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 documents.
 4. Mark record sets in red. 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.

2.2 RECORD DIGITAL DATA FILES

- A. Immediately before inspection for Certificate of Substantial Completion, review marked-up record documents with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 2. Incorporate changes and additional information previously marked on record documents. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Architect for resolution.
 4. Architect will furnish Contractor with digital data files of the original Contract Drawings for use in recording information.
 - a. Architect makes no representations as to the accuracy or completeness of Electronic Drawings as they relate to the Contract Drawings.
 - b. Digital Data Software Program: The electronic files will be made available in the digital data software program in which they were produced by the Architect. Contractor is responsible for any necessary conversions to an alternate software program.
 - c. See Section 01 33 00 - Submittal Procedures and "Electronic File Transfer Agreement" form for requirements related to use of Architect's digital data files.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where 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.
 2. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location
1. 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.
 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS".
 - d. Name of Architect.
 - e. Name of Contractor.

2.3 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 scanned PDF electronic file(s).

2.4 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 and record Drawings where applicable.

B. Format: Submit record Product Data as scanned PDF electronic file(s).

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.5 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 scanned PDF electronic file(s).

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

SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.

1.2 DEFINITIONS

- A. BoD: Basis of Design.
- B. CxA: Commissioning Authority.
- C. OPR: Owner's Project Requirements.
- D. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.
- E. TAB: Testing, Adjusting, and Balancing.

1.3 COMMISSIONING TEAM

- A. Members Appointed by Contractor(s): Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.
- B. Members Appointed by Owner:
 - 1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
 - 2. Representatives of the facility user and operation and maintenance personnel.
 - 3. Architect and engineering design professionals.

1.4 OWNER'S RESPONSIBILITIES

- A. Provide the OPR documentation to the CxA and Contractor for use in developing the commissioning plan; systems manual; operation and maintenance training plan; and testing plans and checklists.
- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
 - 1. Coordination meetings.

2. Training in operation and maintenance of systems, subsystems, and equipment.
 3. Testing meetings.
 4. Demonstration of operation of systems, subsystems, and equipment.
- C. Provide utility services required for the commissioning process.
- D. Provide the BoD documents, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Provide utility services required for the commissioning process.
- B. Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
1. Participate in design- and construction-phase coordination meetings.
 2. Participate in maintenance orientation and inspection.
 3. Participate in operation and maintenance training sessions.
 4. Participate in final review at acceptance meeting.
 5. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
 6. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 7. Review and approve final commissioning documentation.
- C. Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
1. Participate in design- and construction-phase coordination meetings.
 2. Participate in maintenance orientation and inspection.
 3. Participate in procedures meeting for testing.
 4. Participate in final review at acceptance meeting.
 5. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.
 6. Provide information to the CxA for developing construction-phase commissioning plan.
 7. Participate in training sessions for Owner's operation and maintenance personnel.
 8. Provide updated Project Record Documents to the CxA on a daily basis.
 9. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA, as specified in Division 01 Section "Operation and Maintenance Data."
 10. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.

1.6 CXA'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Prepare a construction-phase commissioning plan. Collaborate with Contractor and with subcontractors to develop test and inspection procedures. Include design changes and scheduled commissioning activities coordinated with overall Project schedule. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.
- C. Review and comment on submittals from Contractor for compliance with the OPR, BoD, Contract Documents, and construction-phase commissioning plan. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the OPR and BoD.
- D. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The CxA shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.
- E. At the beginning of the construction phase, conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; and Project completion.
- F. Observe and inspect construction and report progress and deficiencies. In addition to compliance with the OPR, BoD, and Contract Documents, inspect systems and equipment installation for adequate accessibility for maintenance and component replacement or repair.
- G. Prepare Project-specific test and inspection procedures and checklists.
- H. Schedule, direct, witness, and document tests, inspections, and systems startup.
- I. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
- J. Certify date of acceptance and startup for each item of equipment for start of warranty periods.
- K. Review Project Record Documents for accuracy. Request revisions from Contractor to achieve accuracy. Project Record Documents requirements are specified in Section 01 78 39 - Project Record Documents.
- L. Review and comment on operation and maintenance documentation and systems manual outline for compliance with the OPR, BoD, and Contract Documents. Operation and maintenance documentation requirements are specified in Section 01 78 23 - Operation and Maintenance Data.
- M. Prepare operation and maintenance training program and provide qualified instructors to conduct operation and maintenance training. Operation and maintenance training is specified in Section 01 79 00 - Demonstration and Training
- N. Videotape and edit training sessions.

- O. Videotape construction progress including hidden shafts.
- P. Prepare commissioning reports.
- Q. Assemble the final commissioning documentation, including the commissioning report and Project Record Documents.

1.7 COMMISSIONING DOCUMENTATION

- A. Index of Commissioning Documents: CxA shall prepare an index to include storage location of each document.
- B. OPR: A written document, prepared by Owner, that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.
- C. BoD Document: A document, prepared by Architect, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- D. Commissioning Plan: A document, prepared by CxA, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited to the following:
 - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
 - 2. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.
 - 3. Identification of systems and equipment to be commissioned.
 - 4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
 - 5. Identification of items that must be completed before the next operation can proceed.
 - 6. Description of responsibilities of commissioning team members.
 - 7. Description of observations to be made.
 - 8. Description of requirements for operation and maintenance training, including required training materials.
 - 9. Description of expected performance for systems, subsystems, equipment, and controls.
 - 10. Schedule for commissioning activities with specific dates coordinated with overall construction schedule.
 - 11. Identification of installed systems, subsystems, and equipment, including design changes that occurred during the construction phase.

12. Process and schedule for documenting changes on a continuous basis to appear in Project Record Documents.
 13. Process and schedule for completing prestart and startup checklists for systems, subsystems, and equipment to be verified and tested.
 14. Step-by-step procedures for testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.
- E. Test Checklists: CxA shall develop test checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. Prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Provide space for testing personnel to sign off on each checklist. Specific checklist content requirements are specified in Division 23 Section "HVAC Commissioning Requirements." Each checklist, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:
1. Name and identification code of tested item.
 2. Test number.
 3. Time and date of test.
 4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 5. Dated signatures of the person performing test and of the witness, if applicable.
 6. Individuals present for test.
 7. Deficiencies.
 8. Issue number, if any, generated as the result of test.
- F. Certificate of Readiness: Certificate of Readiness shall be signed by Contractor, Subcontractor(s), Installer(s), and CxA certifying that systems, subsystems, equipment, and associated controls are ready for testing. Completed test checklists signed by the responsible parties shall accompany this certificate.
- G. Test and Inspection Reports: CxA shall record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application shall be included with data. CxA shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.
- H. Corrective Action Documents: CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.
- I. Issues Log: CxA shall prepare and maintain an issues log that describes design, installation, and performance issues that are at variance with the OPR, BoD, and Contract Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.
1. Creating an Issues Log Entry:
 - a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.

- b. Assign a descriptive title of the issue.
 - c. Identify date and time of the issue.
 - d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.
 - e. Identify system, subsystem, and equipment to which the issue applies.
 - f. Identify location of system, subsystem, and equipment.
 - g. Include information that may be helpful in diagnosing or evaluating the issue.
 - h. Note recommended corrective action.
 - i. Identify commissioning team member responsible for corrective action.
 - j. Identify expected date of correction.
 - k. Identify person documenting the issue.
2. Documenting Issue Resolution:
 - a. Log date correction is completed or the issue is resolved.
 - b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
 - c. Identify changes to the OPR, BoD, or Contract Documents that may require action.
 - d. State that correction was completed and system, subsystem, and equipment is ready for retest, if applicable.
 - e. Identify person(s) who corrected or resolved the issue.
 - f. Identify person(s) documenting the issue resolution.
 3. Issues Log Report: On a periodic basis, but not less than for each commissioning team meeting, CxA shall prepare a written narrative for review of outstanding issues and a status update of the issues log. As a minimum, CxA shall include the following information in the issues log and expand it in the narrative:
 - a. Issue number and title.
 - b. Date of the identification of the issue.
 - c. Name of the commissioning team member assigned responsibility for resolution.
 - d. Expected date of correction.
- J. Commissioning Report: CxA shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BoD, and Contract Documents. The commissioning report shall include, but is not limited to, the following:
1. Lists and explanations of substitutions; compromises; variances in the OPR, BoD, and Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during Owner occupancy and operation. It shall describe components and performance that exceed requirements of the OPR, BoD, and Contract Documents and those that do not meet requirements of the OPR, BoD, and Contract Documents. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.
 2. OPR and BoD documentation.

3. Commissioning plan.
 4. Testing plans and reports.
 5. Corrective modification documentation.
 6. Issues log.
 7. Completed test checklists.
 8. Listing of off-season test(s) not performed and a schedule for their completion.
- K. Systems Manual: CxA shall gather required information and compile systems manual. Systems manual shall include, but is not limited to, the following:
1. OPR and BoD, including system narratives, schematics, and changes made throughout the Project.
 2. Project Record Documents as specified in Section 01 78 39 - Project Record Documents.
 3. Final commissioning plan.
 4. Commissioning report.
 5. Operation and maintenance data as specified in Section 01 78 23 - Operation and Maintenance Data.

1.8 SUBMITTALS

- A. Commissioning Plan Prefinal Submittal: CxA shall submit three hard copies of prefinal commissioning plan. Deliver one copy to Contractor, one to Owner, and one to Architect. Present submittal in sufficient detail to evaluate data collection and arrangement process. One copy, with review comments, will be returned to the CxA for preparation of the final construction-phase commissioning plan.
- B. Commissioning Plan Final Submittal: CxA shall submit three hard copies and two sets of electronically formatted information of final commissioning plan. Deliver one hard copy and one set of discs to Owner, and two copies to Architect. The final submittal must address previous review comments. The final submittal shall include a copy of the prefinal submittal review comments along with a response to each item.
- C. Test Checklists and Report Forms: CxA shall submit sample checklists and forms to Contractor quality-control manager and subcontractors for review and comment. Submit three copies of each checklist and report form.
- D. Certificates of Readiness: CxA shall submit Certificates of Readiness.
- E. Test and Inspection Reports: CxA shall submit test and inspection reports.
- F. Corrective Action Documents: CxA shall submit corrective action documents.
- G. Prefinal Commissioning Report Submittal: CxA shall submit two hard copies of the prefinal commissioning report. Include a copy of the preliminary submittal review comments along with CxA's response to each item. CxA shall deliver one copy to Owner and one copy to Architect. One copy, with review comments, will be returned to the CxA for preparation of final submittal.

- H. Final Commissioning Report Submittal: CxA shall submit two hard copies and two sets of electronically formatted information of the final commissioning report. CxA shall deliver one hard copy and one set of discs to Owner, and one copy to Architect. The final submittal must address previous review comments and shall include a copy of the prefinal submittal review comments along with a response to each item.

1.9 QUALITY ASSURANCE

- A. Instructor Qualifications: Factory-authorized service representatives, experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
- B. Test Equipment Calibration: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.

1.10 COORDINATION

- A. Coordinating Meetings: CxA shall conduct biweekly coordination meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.
- B. Pretesting Meetings: CxA shall conduct pretest meetings of the commissioning team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.
- C. Testing Coordination: CxA shall coordinate sequence of testing 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.
- D. Manufacturers' Field Services: CxA shall coordinate services of manufacturers' field services.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

- A. Training Preparation Conference: Before operation and maintenance training, CxA shall convene a training preparation conference to include Owner's operation and maintenance personnel, Contractor, and subcontractors. In addition to requirements specified in Section 01 79 00 - Demonstration and Training, perform the following:
1. Review the OPR and BoD.
 2. Review installed systems, subsystems, and equipment.
 3. Review instructor qualifications.
 4. Review instructional methods and procedures.
 5. Review training module outlines and contents.
 6. Review course materials (including operation and maintenance manuals).
 7. Inspect and discuss locations and other facilities required for instruction.
 8. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.
 9. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.
- B. Training Modules: Develop an instruction program that includes individual training modules for each system, subsystem, and equipment as specified in Section 01 79 00 - Demonstration and Training.

END OF SECTION

SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

1.2 DEFINITIONS

- A. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- B. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- C. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.5 SUBMITTALS

- A. Informational Submittals:
 - 1. Qualification Data: For refrigerant recovery technician.
 - 2. Engineering Survey: Submit engineering survey of condition of building.
 - 3. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for environmental protection, dust control, and noise control. Indicate proposed locations and construction of barriers.

4. Schedule of Selective Demolition Activities: Indicate the following:
 - a. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's, building manager's, and other tenants' on-site operations are uninterrupted.
 - b. Interruption of utility services. Indicate how long utility services will be interrupted.
 - c. Coordination for shutoff, capping, and continuation of utility services.
 - d. Use of elevator and stairs.
 - e. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
5. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 - Photographic Documentation. Submit before Work begins.
6. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
7. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 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.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 1. Maintain fire-protection facilities in service during selective demolition operations.

1.7 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.

- 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.

1.8 COORDINATION

- A. Arrange selective demolition schedule to not interfere with Owner's operations.

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 ASSE 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. Engage a professional engineer to 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. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs or video, and templates.
 - 1. Comply with requirements specified in Section 01 32 33 - Photographic Documentation.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

SELECTIVE DEMOLITION

- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
1. Arrange to shut off utilities with utility companies.
 2. Notify the Architect immediately if the removal of fire-suppression, plumbing HVAC, electrical, communications, and safety and security systems or components will adversely affect the operation of those systems outside the limits of demolition.
 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC 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. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

- A. 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.

- B. 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.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the 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 4 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.
 - 10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 - Construction Waste Management and Disposal.
- 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.
- C. 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.

SELECTIVE DEMOLITION

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.
- D. 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 during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

3.6 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.
- B. Burning: Do not burn demolished materials.

3.7 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

SECTION 03 54 16

CEMENT-BASED UNDERLAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cement-based, polymer-modified, self-leveling underlayment for application below interior floor coverings.
 - 1. Broad scope leveling of existing concrete floors scheduled to have existing flooring and associated adhesive removed, and new finish flooring applied.
 - 2. Transitioning leveling of floors to create uniform level height between different flooring materials.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product indicated.
 - 2. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.
- B. Informational Submittals:
 - 1. Qualification Data: For qualified Installer.
 - 2. Product Certificates: Signed by manufacturers of underlayment and floor-covering systems certifying that products are compatible.
 - 3. Minutes of preinstallation conference.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.
- B. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.
- C. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
 - 1. Place cement-based underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

1.6 COORDINATION

- A. Coordinate application of underlayment with requirements of floor-covering products and adhesives, to ensure compatibility of products.

PART 2 PRODUCTS

2.1 CEMENT-BASED UNDERLAYMENTS

- A. Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in minimum uniform thickness of 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.
 - 1. Products:
 - a. Ardex; K-15 Self-Leveling Underlayment Concrete.
 - b. BASF Construction Chemicals, Inc.; MBT Mastertop 110 Plus Underlayment.
 - c. Dayton Superior Corporation; Levelayer.
 - d. L&M Construction Chemicals, Inc.; Levelex.
 - e. MAPEI Corporation; Ultraplan 1 Plus.
 - 2. Cement Binder: ASTM C150/C150M, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C129.
 - 3. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C109/C109M.
- B. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).
- C. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
 - 1. Primer shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance.
 - 1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
 - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
 - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
- C. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces according to manufacturer's written instructions.
- D. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
 - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
 - 2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
 - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply underlayment to produce uniform, level surface. Sloping of 1/8 inch in 10'-0" maximum is permitted to produce level surface.
 - 1. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Transitioning Leveling: Apply underlayment as required to create uniform level height between different flooring materials, where transition strips are not indicated on Drawings. Leveling shall extend out as needed to conform to ADA requirements.
- F. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

SECTION 04 22 00
CONCRETE UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete masonry units.
- B. Decorative concrete masonry units.
- C. Mortar and grout.
- D. Steel reinforcing bars.
- E. Masonry-joint reinforcement.
- F. Embedded flashing.
- G. Miscellaneous masonry accessories.
- H. Products Installed but not Furnished under This Section:
 - 1. Cast-stone trim in concrete unit masonry.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Shop Drawings: For the following:
 - a. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - b. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
 - c. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- B. Informational Submittals:
 - 1. Qualification Data: For testing agency.

Usually retain "Material Certificates" Paragraph below. Material certificates are required for all masonry constructed according to TMS 402/ACI 530/ASCE 5.

2. Material Certificates: For each type and size of the following:
 - a. Masonry units.
 - 1) Include data on material properties.
 - 2) For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 - b. Integral water repellent used in CMUs.
 - c. Cementitious materials. Include name of manufacturer, brand name, and type.
 - d. Mortar admixtures.
 - e. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - f. Grout mixes. Include description of type and proportions of ingredients.
 - g. Reinforcing bars.
 - h. Joint reinforcement.
 - i. Anchors, ties, and metal accessories.
3. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - a. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
 - b. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.
4. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
5. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.
 1. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
 - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
 - 2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C1314.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet (6 m) vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide square-edged units for outside corners unless otherwise indicated.

- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E514/E514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) BASF Corporation; Construction Systems; MasterPel.
 - 2) Euclid Chemical Company (The); an RPM company; Eucon Blocktite.
 - 3) GCP Applied Technologies Inc. (formerly Grace Construction Products); Dry-Block.
- C. CMUs: ASTM C90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
 2. Density Classification: Normal weight.
 3. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less-than-nominal dimensions.
 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
 5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.
- D. Decorative CMUs: ASTM C90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
 2. Density Classification: Lightweight.
 3. Size (Width): Manufactured to dimensions specified in "CMUs" Paragraph.
 4. Pattern and Texture:
 - a. Standard pattern, ground-face finish. Match Architect's samples.
 - b. Standard pattern, split-face finish. Match Architect's samples.
 - c. Standard pattern, split-ribbed finish. Match Architect's samples.
 - d. Scored vertically so units laid in running bond appear as square units laid in stacked bond, standard finish. Match Architect's samples.
 - e. Triple scored vertically so units laid in running bond appear as vertical units laid in stacked bond (soldier courses), standard finish. Match Architect's samples.
 5. Colors: As indicated by manufacturer's designations.
 6. Special Aggregate: Provide units made with aggregate matching aggregate in Architect's sample.

2.5 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Manufacture aggregate for mortar and grout, cement, and lime within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.
- B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Colored Cement Products: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
 - 1. Colored Portland Cement-Lime Mix:
 - a. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - 1) Essroc; i.design flamingo-BRIXMENT Blend.
 - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
 - 3) Lafarge North America Inc.; Eaglebond Portland & Lime.
 - 4) Lehigh Hanson; HeidelbergCement Group; Lehigh Custom Color Portland/Lime Cement.
 - 2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - 3. Pigments shall not exceed 10 percent of portland cement by weight.
- F. Aggregate for Mortar: ASTM C144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C404.
- H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation; Construction Systems; Trimix-NCA.
 - b. Euclid Chemical Company (The); an RPM company; Accelguard.
 - c. GCP Applied Technologies Inc. (formerly Grace Construction Products); Morset.

- I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation; Construction Systems; Rheopel Plus Mortar Admixture.
 - b. Euclid Chemical Company (The); an RPM company; Blocktite Mortar.
 - c. GCP Applied Technologies Inc. (formerly Grace Construction Products); Dry-Block Mortar Admixture.
- J. Water: Potable.

2.6 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60 (Grade 420).
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. Heckmann Building Products, Inc.; #374: Steel-Wich.
 - b. Hohmann & Barnard, Inc.; RB Rebar Positioner.
 - c. Wire-Bond, Figure 8 Rebar Positioners.
- C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A951/A951M.
 - 1. Interior Walls: Mill-galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
 - 5. Spacing of Cross Rods: Not more than 16 inches (407 mm) o.c.
 - 6. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

2.7 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into masonry but with at least a 5/8-inch (16-mm) cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Mill-Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A641/A641M Class 1 coating.
 - 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
 - 3. Stainless Steel Wire: ASTM A580/A580M, Type 304.
 - 4. Galvanized-Steel Sheet: ASTM A653/A653M, Commercial Steel, G60 (Z180) zinc coating.

5. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
 6. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666 , Type 304.
 7. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Partition Top Anchors: 0.105-inch- (2.66-mm-) thick metal plate with a 3/8-inch- (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- D. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

2.8 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing: Use the following unless otherwise indicated:
1. Stainless Steel Core Flexible Flashing With Drainage Fabric: Engineered system, with high resistance to damage, composite sheet with a stainless steel core, non-asphalt adhesive polymer fabric laminated to one face of sheet, and non-woven drainage fabric laminated to opposing face with non-asphalt adhesive.
 - a. Stainless Steel: ASTM A240/A240M, Type 304, 0.011 inch (0.28 mm) thick. Recycled content: 60 percent.
 - b. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - 1) York Manufacturing, Inc.; Multi-Flash SS.
 - 2) STS Coatings, Inc.; Gorilla Flash Stainless Fabric.
 - 3) Hohmann & Barnard: Mighty-Flash.
 - c. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
 - d. Use only where flashing is fully concealed in masonry.
- B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

- D. Weep/Cavity Vent Products: Use one of the following unless otherwise indicated:
1. Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 by 3-1/2 inches (9 by 38 by 89 mm) long.
 2. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.
 3. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe; in color selected from manufacturer's standard.
 - a. Products: Subject to compliance with requirements, provide products by one of the following:
 - 1) Advanced Building Products Inc.; Mortar Maze Cell Vents.
 - 2) CavClear/Archovations, Inc.; CavClear Weep Vents.
 - 3) Heckmann Building Products Inc.; No. 85 Cell Vents.
 - 4) Hohmann & Barnard, Inc.; QV Quadro-Vents.
 - 5) Wire-Bond; #3601 Cell Vent.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Products: Subject to compliance with requirements, provide products by one of the following:
 - a. Advanced Building Products Inc.; Mortar Break II.
 - b. CavClear/Archovations, Inc.; Masonry Mat.
 - c. Heckmann Building Products, Inc.; #84 Weep-Thru Mortar Deflector.
 - d. Hohmann & Barnard, Inc.; Mortar Trap.
 - e. Mortar Net Solutions; Mortar Net.
 - f. Wire-Bond; Cavity Net.
 2. Configuration: Provide one of the following:
 - a. Strips, full depth of cavity and 10 inches (250 mm) high, with dovetail-shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.
 - b. Strips, not less than 1-1/2 inches (38 mm) thick and 10 inches (250 mm) high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
 - c. Sheets or strips, full depth of cavity and installed to full height of cavity.
 - d. Sheets or strips not less than 1-1/2 inches (38 mm) thick and installed to full height of cavity, with additional strips 4 inches (100 mm) high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.

2.10 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.

3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type N.
 3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 4. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
 1. Mix to match Architect's sample.
 2. Application: Use colored-aggregate mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Cast-stone trim units.
- E. Grout for Unit Masonry: Comply with ASTM C476.
 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
 3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C143/C143M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that would impair mortar bond.

- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
 - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
 - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
 - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
 - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
 - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
 - 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
 - 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.

7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm).

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches (50 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.

2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c. unless otherwise indicated.
3. Wedge nonload-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 43 "Joint Firestopping."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 2. Wet joint surfaces thoroughly before applying mortar.
 3. Rake out mortar joints for pointing with sealant.
- D. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch (6 mm) and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- F. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- G. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.
 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
 2. Install preformed control-joint gaskets designed to fit standard sash block.
 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
 4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

3.8 LINTELS

- A. Provide concrete lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
- B. Install steel lintels where indicated.
- C. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.9 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape.
 2. At lintels, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
 3. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.10 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140/C140M for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.
- I. Prism Test: For each type of construction provided, according to ASTM C1314 at 7 days and at 28 days.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.13 MASONRY WASTE DISPOSAL

- A. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 05 43 00

SLOTTED CHANNEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Slotted channel framing for equipment.
- B. Slotted channel framing for mechanical and electrical equipment.
- C. Slotted channel framing for applications where framing and supports are not specified in other Sections.

1.2 COORDINATION

- A. Coordinate installation of slotted channel framing that is anchored to or that will receive other work. 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.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product indicated.
 - 2. Shop Drawings: Indicate plan layout, typical elevations, details and anchoring methods.
- B. Informational Submittals
 - 1. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, within the State of the Project, responsible for their preparation.
 - 2. Submit following:
 - a. Certificates verifying AWS qualifications within previous 12 months for each welder employed for Work.
 - b. Manufacturer's certification that products furnished for Project meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Engineer Qualifications: Registered professional engineer licensed to practice structural engineering in jurisdiction where Project is located, with minimum of five years experience in design of medical support systems.

- B. Manufacturer Qualifications: Company specializing in manufacturing, fabricating, and installing Products specified in this Section with minimum five years experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 60 00 - Product Requirements.
 - 1. Deliver components of system required to be installed by other trades in sufficient time not to delay work of project.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Requirements: Drawings are diagrammatic and are intended to establish basic dimension of units, sight lines, ceiling heights, and profiles of units.
- B. Manufacturer: Responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
 - 1. Employ registered professional engineer, licensed to practice structural engineering in jurisdiction where Project is located, to engineer each component of medical support systems.
- C. Attachment Considerations: Account for site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening and fracturing connection between units and building structure or between components themselves.
 - 1. Make modifications only to meet field conditioned and ensure fitting of system components.
 - 2. Obtain Architect's approval of modifications and for connections to building elements at locations other than indicated on Drawings.
- D. Support Structure: Locate support members in order to maintain scheduled ceiling planes indicated on Drawings. Make possible attachment of equipment support rails at any point along support system without drilling or welding into system.
 - 1. Ceiling Anchorage: For framing scheduled to be mounted to ceilings, attach to ceiling by means of imbedded concrete inserts, through bolts or direct attachment to structural framing.
 - 2. Rigidly fix and brace support structure against sway.
- E. Loading: Design support structure to support vertical load, maximum eccentricity of vertical load from support point, transverse force acting on longitudinal rail, longitudinal force acting on longitudinal rail, and deflection criteria established for each piece of supported equipment.
 - 1. If loads are not defined for piece of supported equipment assume concentrated load of 1500 pounds at any point along equipment rails. Concentrated load is maximum encountered by positioning of equipment at extremities of its travel (maximum load configuration).

2. Safety Factor: Design support structure for minimum safety factor of three based on ultimate strength under static loading conditions. Structure shall not deflect more than 1/720 span vertically or horizontally when maximum loading conditions of equipment operation are applied on either rail.
- F. Interface with Adjacent Systems: Integrate design and connections with adjacent construction.
1. Accommodate allowable tolerances and deflections for structural members in installation.
 2. Coordinate with reflected ceiling plan and other items indicated to be placed in or above ceiling to ensure support system does not interfere with or dislocate other items.

2.2 MANUFACTURERS

- A. Slotted Channel Framing:
1. Cooper B-Line, Inc.
 2. Flex-Strut, Inc. Metal Framing Products
 3. Hilti, Inc., "Hilti Strut MQ."
 4. Tyco Fire Suppression & Building Products "Unistrut" Metal Framing

2.3 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.4 SLOTTED CHANNEL FRAMING

- A. Framing Members: Cold-formed metal channels with continuous slot complying with MFMA-3, and as follows:
1. Cold-formed metal channels with flange edges returned toward web with 9/16 inch wide slotted holes in webs at 2 inches on center.
 2. Width, Depth, Thickness: As required by design to meet structural performance.
- B. Materials:
1. Steel Sheet Structural Quality: ASTM A 570, Grade 33.
 2. Zinc-Coated Steel Sheet: ASTM A653/A653M, Quality SQ, Grade 33, G90.
 3. Hot-Rolled Steel Bar: ASTM A 575.
 4. Hot-Rolled Steel Sheet and Strip: ASTM A 569.
 5. Fasteners and Anchors: Concrete inserts, bolts or direct attachment to structural framing.
- C. Finishes:
1. System components: Manufacturer's standard corrosion resistant factory-painted acrylic enamel finish.
 2. Hardware: Electro-galvanized.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions and proceed with Work in accordance with Section 01 73 00 - Execution.

3.2 INSTALLATION

- A. Support Systems: Install in accordance with approved Shop Drawings and manufacturer's installation instructions and recommendations.
- B. Structural Assembly: Install supporting framework plumb and true. Tolerances:
 - 1. Mount surfaces of support structure horizontal within tolerance of 1/32 inch in 24 inches and within 1/16 inch in 18 foot length.
 - 2. Elevation of one rail mounting surface to other shall be within 1/16 inch in any 24 inches length of rails.

3.3 PROTECTION

- A. Protect finished installation under provisions of Section 01 73 00 - Execution.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For the following:
 - a. Nonslip aggregates and nonslip-aggregate surface finishes.
 - b. Fasteners.
 - c. Shop primers.
 - d. Shrinkage-resisting grout.
 - 2. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - 3. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, within the State of the Project, responsible for their preparation.
- B. Informational Submittals:
 - 1. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
 - 2. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.

3. Welding certificates.
4. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
5. Research Reports: For post-installed anchors.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 - Quality Requirements, using performance requirements and design criteria indicated.
 1. Design Calculations: Submit design calculations for the following:
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- D. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.
- E. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.

- F. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- G. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- H. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Provide stainless steel fasteners for fastening aluminum or stainless steel.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A ASTM A568/A568M, Property Class 4.6); with hex nuts, ASTM A563/A563M; and, where indicated, flat washers.
- D. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 3, heavy-hex steel structural bolts; ASTM A563/A563M, Grade DH3, (ASTM A563/A563M, Class 10S3) heavy-hex carbon-steel nuts; and where indicated, flat washers.
- E. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy Group 1 (A1).
- F. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563/A563M; and, where indicated, flat washers.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- G. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- H. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- I. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless steel bolts, ASTM F593, and nuts, ASTM F594 (ASTM F836M).

2.4 MISCELLANEOUS MATERIALS

- A. Zinc-Rich Primer for Ferrous Metal: Organic zinc-rich primer, complying with SSPC-Paint 20 and compatible with topcoat.
 - 1. Products:
 - a. Carbozinc 621; Carboline Company.
 - b. Aquapon Zinc-Rich Primer 97-670; PPG Industries, Inc.
 - c. Series 90-97 - Tneme-Zinc; Tnemec Company, Inc.
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.7 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.8 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
- B. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- C. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- D. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer unless zinc-rich primer is indicated.
- E. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6 /NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3 , "Commercial Blast Cleaning."

3. Items Indicated to Receive Primers Specified in Section 09 96 00 - High-Performance Coatings: SSPC-SP 6 /NACE No. 3, "Commercial Blast Cleaning."
 4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
 5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
- F. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 1. Cast Aluminum: Heavy coat of bituminous paint.
 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 REPAIRS

- A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

SECTION 06 10 53

MISCELLANEOUS CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wood blocking, cants, and nailers.
- B. In wall blocking for wall mounting equipment and accessories.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater size but less than 5 inches nominal (114 mm actual) size in least dimension.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - a. 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.

For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

- B. Informational Submittals:
 - 1. Evaluation Reports: For the following, from ICC-ES:
 - a. Preservative-treated wood.
 - b. Fire-retardant-treated wood.
 - c. Metal framing anchors.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber 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: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded 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 or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal (38-mm actual) thickness or less; no limit for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- 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 (3.2 mm) 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 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a 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 or omit marking and provide certificates of treatment compliance issued by inspection agency.
- 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.

2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
- 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.
 - 6. Western woods; WCLIB or WWPA.
 - 7. Northern species; NLGA.
 - 8. Eastern softwoods; NeLMA.
- C. Concealed Boards: 19 percent maximum moisture content of any of the following species and grades:
 - 1. Mixed southern pine or southern pine, No. 3 grade; SPIB.
 - 2. Hem-fir or hem-fir (north), Standard or No. 3 Common grade; NLGA, WCLIB, or WWPA.
 - 3. Spruce-pine-fir (south) or spruce-pine-fir, Standard or No. 3 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.

2.4 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where 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.
- B. Nails, Brads, and Staples: ASTM F1667/F1667M.
- C. Screws for Fastening to Metal Framing: ASTM C954, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.

2.6 METAL FRAMING ANCHORS

- A. Manufacturers:
 - 1. Cleveland Steel Specialty Co.
 - 2. KC Metals Products, Inc.
 - 3. Phoenix Metal Products, Inc.
 - 4. Simpson Strong-Tie Co., Inc.
 - 5. USP Structural Connectors.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - 1. Use for interior locations unless otherwise indicated.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- C. Do not splice structural members between supports unless otherwise indicated.

- 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 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 (406 mm) o.c.
- E. 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.
- F. Comply with AWP A M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach 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.

3.2 SLEEPER, BLOCKING AND NAILER, OR METAL STRAPPING INSTALLATION

- A. Install where indicated and where required for 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.

Fire-treated wood blocking is required at the following locations:

- 1. Audio / Visual equipment.
- C. Where indicated or where wood blocking is not allowed by code, utilize galvanized sheet metal backing plates. Plating shall be long enough to span across a minimum of 3 studs, unless otherwise indicated, and may be one of the following:
 - 1. Galvanized steel plate 0.053-inch (1.34-mm) thick minimum by 4-inches (102-mm) wide.
 - 2. 3-5/8 inches (92.1 mm) un-punched wide flange steel stud of 0.053 inch (1.34-mm) thick. Notch studs so that backing plate will be flush with exterior face of stud.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
 - 1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.
- B. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) o.c.

3.4 PLYWOOD BACKING PANELS

- A. Provide fire retardant-treated 3/4-inch (19-mm) thick plywood panels to each wall scheduled to receive electrical, telephone, communications, data, or similar equipment.
 - 1. Do not install panels within 2 feet (610 mm) of the floor nor within 2 feet (610 mm) of a door frame.

SECTION 06 41 16

PLASTIC-LAMINATE-CLAD ARCHITECTURAL PANEL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plastic-laminate-clad architectural panel.
- B. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural panels that are not concealed within other construction.
- C. Coordination and preparation as required to accommodate 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 panels.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Coordination: Submit related shop drawings, specified in another Section simultaneously for approval.
 - a. Countertops shops, showing all dimensions and indicating how countertops are to be mounted to panels.
 - 2. Product Data: For each type of product.
 - 3. Shop Drawings:
 - a. Include plans, elevations, sections, and attachment details.
 - b. Show large-scale details.
 - c. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - d. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural panels.
 - 4. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.
- B. Informational Submittals:
 - 1. Qualification Data: For manufacturer and Installer.

1.5 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.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of typical architectural panels as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver panels until painting and similar finish operations that might damage architectural panels have been completed in installation areas. Store panels in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

- A. Field Measurements: Where panels 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 panels by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL PANELS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of panels 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. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 - 1. Manufacturers:
 - a. Abet Laminati Inc.

- b. Formica Corporation.
 - c. Lamin-Art, Inc.
 - d. Pionite; a Panolam Industries International, Inc. brand.
 - e. Wilsonart.
- E. Laminate Cladding for Exposed Surfaces:
- 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade VGS.
 - 4. Exposed Edging for Door and Drawer Fronts: Plastic laminate matching door and drawer front. Apply with hot adhesive.
- F. Materials for Semiexposed Surfaces:
- 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - a. Edges of Plastic-Laminate Shelves: PVC tape, 0.018-inch (0.460-mm) minimum thickness, matching laminate in color, pattern, and finish.
 - b. Edges of Thermoset Decorative 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, NEMA LD 3, Grade VGS.
 - 2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
 - 3. Drawer Bottoms: Thermoset decorative panels.
- G. Dust Panels: 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
- 1. Color: Refer to Interior Finish Legend on Drawings.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural panel 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 panel and quality grade specified unless otherwise indicated.
- 1. Softwood Plywood: DOC PS 1, medium-density overlay.
 - 2. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 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: Contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.4 FABRICATION

- A. Fabricate architectural panels 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.
- 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.

PART 3 EXECUTION

3.1 PREPARATION

- A. Before installation, condition panels to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install panels to comply with quality standard grade of item to be installed.
- B. Assemble panels and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor panels to anchors or blocking built in or directly attached to substrates. Secure with wafer-head installation screws.
- D. Install panel level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm) using concealed shims.
 - 1. Scribe and cut panel to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

2. Install panel 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 panel through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective panels, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural panels. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean panels on exposed and semiexposed surfaces.

END OF SECTION

SECTION 06 61 16

SOLID SURFACING COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Coordination: Submit related shop drawings, specified in another Section simultaneously for approval.
 - a. Cabinet shops, showing all dimensions and indicating how countertops are to be mounted to cabinets.
 - 2. Product Data: For countertop materials and sinks.
 - 3. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
 - a. Show locations and details of joints.
 - b. Show direction of directional pattern, if any.
 - 4. Samples for Verification: For the following products:
 - a. Countertop material, 6 inches (150 mm) square.
- B. Informational Submittals:
 - 1. Qualification Data: For fabricator.
- C. Closeout Submittals:
 - 1. 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.

1.3 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.
- C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
 - 1. Build mockup of typical countertop as shown on Drawings or as directed by Architect.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.5 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
1. Manufacturers:
 - a. Affinity Surfaces; a brand of Domain Industries, Inc.
 - b. Avonite Surfaces.
 - c. Corian, E. I. du Pont de Nemours and Company.
 - d. Formica Corporation.
 - e. LG Chemical, Ltd.
 - f. Meganite Inc.
 - g. Samsung Chemical USA, Inc.
 - h. Swan Corporation (The).
 - i. Transolid Div of Trumbull Industries.
 - j. Wilsonart LLC.
 - B. Composite Wood Products: Products shall be made without urea formaldehyde.
 - C. Composite Wood Products: Products shall comply with the testing and product 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."
 - D. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 COUNTERTOP 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.
- C. Countertops: 1/2-inch- (12.7-mm-) thick, solid surface material with front edge built up with same material.
- D. Fabricate tops with shop-applied edges and backsplashes 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.
- E. Joints: Fabricate countertops in sections for joining in field.
 1. Joint Locations: Not within 18 inches (450 mm) of a sink or cooktop and not where a countertop section less than 36 inches (900 mm) long would result, unless unavoidable.
 2. 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.
- F. 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 (5 mm) into fixture opening.
 - b. Provide vertical edges, rounded to 3/8-inch (10-mm) radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch (5 mm) into fixture opening.
 - c. Provide 3/4-inch (20-mm) full bullnose edges projecting 3/8 inch (10 mm) 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 SOLID-SURFACE-MATERIAL FABRICATIONS

- A. Fabrication: Fabricate items in one piece with shop-applied edges unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

2.4 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
 1. Adhesives shall have a VOC content of 70 g/L or less.
- B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

2.5 ACCESSORIES

- A. Grommets for Cable Passage through Countertops: Doug Mockett and Company as follows:
 1. EDP3 Flip-Top Series 2-1/2 inch Grommet.
 2. RG Rectangular Grommet.

3. Color: As selected by Architect from manufacturer's full range of colors.
- B. Countertop Support Brackets: Steel, 18 by 24 inches, minimum 1,000 lb. load limit.
 1. Basis of Design: A & M Hardware, Inc.; Work Station Brackets.
 2. Provide manufacturer's standard factory-applied primer. Refer to Division 09 Section "Painting" for finish coat.
 3. Paint to match wall finish or solid surface material.

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 (3 mm in 2.4 m), 1/4 inch (6 mm) maximum. Do not exceed 1/64-inch (0.4-mm) 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. 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. Pre-drill 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.
 - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.
- I. Apply sealant to gaps at walls; comply with Section 07 92 00 - Joint Sealants.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

1.2 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
 - 3. Review requirements for insurance and certificates if applicable.
 - 4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
 - 2. Shop Drawings: For sheet metal flashing and trim.
 - a. Include plans, elevations, sections, and attachment details.
 - b. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
 - c. Include identification of material, thickness, weight, and finish for each item and location in Project.
 - d. Include details for forming, including profiles, shapes, seams, and dimensions.

- e. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
- f. Include details of termination points and assemblies.
- g. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
- h. Include details of roof-penetration flashing.
- i. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
- j. Include details of special conditions.
- k. Include details of connections to adjoining work.
- l. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).

B. Informational Submittals:

- 1. Qualification Data: For fabricator.
- 2. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested and FM Approvals approved.
- 3. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- 4. Sample Warranty: For special warranty.

C. Closeout Submittals:

- 1. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested and FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. FM Approvals Listing: Manufacture and install copings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-60. Identify materials with name of fabricator and design approved by FM Approvals.
- D. SPRI Wind Design Standard: Manufacture and install copings tested according to SPRI ES-1 and capable of resisting the following design pressure:
 1. Design Pressure: As indicated within related Roofing Section.
- E. Recycled Content of Steel-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- F. Recycled Content of Zinc-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 15 percent.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
 - 3. Products:
 - a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

- F. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- H. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
- I. Do not use graphite pencils to mark metal surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.
- B. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
 - 6. Do not use graphite pencils to mark metal surfaces.

- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
 - 1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 - Joint Sealants.
- G. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.

- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 84 13
PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Penetrations in fire-resistance-rated walls.
- B. Penetrations in horizontal assemblies.
- C. Penetrations in smoke barriers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Include the following participants:
 - a. Contractor.
 - b. Architect.
 - c. Installers.
 - d. 3rd party inspectors.
 - e. Firestopping manufacturer.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - a. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.
- B. Informational Submittals:
 - 1. Qualification Data: For Installer.
 - 2. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.
- C. Closeout Submittals:

1. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 1. For systems that utilize a pre-formed firestop device, Installer shall be trained directly from manufacturer.
 2. For systems that require sealants, putties, or sprays a firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors", or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements" is required.
- B. Installer Qualifications: Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.

2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."
 - 3) FM Global in its "Building Materials Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 1. Manufacturers:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. RectorSeal.
 - d. Specified Technologies, Inc.
 - e. Tremco, Inc.
- B. Source Limitations:
 1. Obtain joint and penetration firestopping primary materials through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing principle materials described in this Section.
 2. Provide secondary materials of type and from source recommended by manufacturer of primary materials.
- C. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- D. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- E. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.

- F. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of less than or equal to 1 determined by ASTM G21.
- G. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
 - 1. Sealant shall have a VOC content of 250 g/L or less.
 - 2. Sealant shall comply with the testing and product 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."
- H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
 - 1. Acceptable Products:
 - a. CP 680-P/M Cast-in Firestop Device by Hilti.
 - b. CFS-DID Firestop Drop-In Device by Hilti.
 - c. CFS-CID P/M Cast-in Firestop Device for Larger Pipes by Hilti.
 - d. CFS-CID MD P/M Cast in Devices for Metal Decks by Hilti.
- B. Firestop Sealants: Single-component formulations that do not re-emulsify after cure during exposure to moisture.
 - 1. Acceptable Products:
 - a. FS-ONE MAX Intumescent Firestop Sealant by Hilti.
 - b. CP 606 Flexible Firestop Sealant by Hilti.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
 - 1. Acceptable Products:
 - a. CP 643 N and CP 644 Firestop Collar by Hilti.
 - b. CFS-CC Firestop Cable Collar by Hilti.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
 - 1. Acceptable Products:
 - a. CFS-COS Firestop Composite Sheet by Hilti.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
 - 1. Acceptable Products:

- a. CFS-D Firestop Putty Disc, CP 617 Putty Pad, CP 618 Putty Stick, and CP 619 T Putty Roll by Hilti, Inc.
 - b. TREMstop Putty Pads by Tremco TREMstop Firestopping.
 - c. SpecSeal Series SSP Firestop Putty by Specified Technologies, Inc. (STI).
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
1. Acceptable Products:
 - a. CP 648 Firestop Wrap Strip, by Hilti, Inc.
 - b. TREMstop Super Strips by Tremco TREMstop Firestopping.
 - c. SpecSeal Series RED2 or BLU2 Wrap Strip by Specified Technologies, Inc. (STI).
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
1. Acceptable Products:
 - a. CP 637 Firestop Mortar by Hilti, Inc.
 - b. TREMstop Fire Mortar by Tremco TREMstop Firestopping.
 - c. SpecSeal Series SSM Firestop Mortar by Specified Technologies, Inc. (STI).
- H. Blocks: Intumescent flexible block. Non-curing, reusable solution for medium to large openings. No compression required.
1. Acceptable Product:
 - a. CFS-BL Firestop Block by Hilti, Inc.
- I. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
1. Acceptable Product:
 - a. Flamesafe Pillow by Rectorseal.
 - b. SpecSeal Series SSB Firestop Pillows by Specified Technologies, Inc. (STI).
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.
1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions and Spray mastic formulation for use with a power sprayer. For use in top-of-wall joints, curtain wall/edge of slab, expansion joints.
 2. Acceptable Products:
 - a. CFS-S SIL SL (self-leveling), CFS-S SIL GG (gun grade), and CFS-SP SIL (spray mastic) by Hilti, Inc.
 - b. TREMstop Fyre-Sil (self-leveling/gun grade) by Tremco TREMstop Firestopping.

- c. SpecSeal SIL300 Silicone Firestop Sealant or SIL300 SL Self-Leveling Silicone Firestop Sealant by Specified Technologies, Inc. (STI).
- K. Firestop Sleeve Device: Factory assembled sleeves formed from galvanized steel and lined with intumescent material designed to handle 0 to 100 percent visual cable fill.
 - 1. Acceptable Products:
 - a. CP653 Speed Sleeve by Hilti.
 - b. EZ-PATH™ Fire Rated Pathway by Specified Technologies Inc. (STI).
 - L. Polyurethane Firestop Foam: Two component polyurethane foam created through chemical reaction of polyol, water and polyisocyanate, plus flame retardants and other additives (all included in the polyol component). Foam cures within one minute at room temperature to produce non-shrinking smoketight firestopping system and does not require additional firestop coating.
 - 1. Acceptable Product: CP620 Fire Foam by Hilti.

2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, 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 penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.

- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For 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. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. 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 similar to "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing and inspecting 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 according to ASTM E2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

- C. Proceed with enclosing penetration 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 fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
 - 1. Equivalent approved systems by the following are acceptable:
 - a. Intertek Group-listed systems designs in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."
 - b. FM Global-approved systems designs listed in FM Global's "Building Materials Approval Guide" under "Wall and Floor Penetration Fire Stops."
 - B. Penetration Firestopping Systems with No Penetrating Items. Comply with the following:
 - 1. Acceptable UL-Classified Systems with CAJ/CBJ/FA 0000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Acrylic sealant.
 - d. Intumescent putty.
 - e. Mortar.
 - f. Preformed intumescent blocks/plugs.
 - g. Pillows/Bags
- C. Firestop Systems for pipes, plastic or metal, conduit in vertical runs, installed through firestop devices. Comply with the following:
 - 1. Acceptable UL-Classified Systems with FA 1000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 - 2. Type of Firestop Device:

- a. Cast-in Firestop Devices.
 - b. Drop-In Devices.
- D. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing. Comply with the following:
- 1. Acceptable UL-Classified Systems with CAJ/CBJ/FA 1000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Acrylic sealant.
 - d. Intumescent putty.
 - e. Mortar.
 - f. Polyurethane firestop foam.
- E. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing. Comply with the following:
- 1. Acceptable UL-Classified Systems with CAJ/CBJ/WL 2000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Intumescent putty.
 - c. Intumescent wrap strips.
 - d. Firestop device.
 - e. Firestop sleeve device.
 - f. Latex sealant.
- F. Penetration Firestopping Systems for Electrical Cables. Comply with the following:
- 1. Acceptable UL-Classified Systems with CAJ/CBJ/WL 3000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 - 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Latex Sealant
 - c. Pillows/bags
 - d. Intumescent putty.
 - e. Silicone foam.
- G. Penetration Firestopping Systems for Cable Trays with Electric Cables. Comply with the following:
- 1. Acceptable UL-Classified Systems with CAJ/CBJ/WL 4000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.

- a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Latex Sealant
 - c. Pillows/bags
 - d. Intumescent putty.
 - e. Silicone foam.
- H. Penetration Firestopping Systems for Insulated Pipes. Comply with the following:
 1. Acceptable UL-Classified Systems with CAJ/CBJ/WL 5000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Silicone foam.
 - c. Intumescent wrap strips.
 - d. Pre-formed intumescent blocks.
 - e. Latex sealant.
- I. Penetration Firestopping Systems for Miscellaneous Electrical Penetrants. Comply with the following:
 1. Acceptable UL-Classified Systems with CAJ/CBJ/WL 6000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Type of Fill Materials: One or more of the following:
 - a. Intumescent sealant.
 - b. Latex sealant
 - c. Intumescent putty.
 - d. Mortar.
- J. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants. Comply with the following:
 1. Acceptable UL-Classified Systems with CAJ/CBJ/WL 7000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Type of Fill Materials: One or both of the following:
 - a. Intumescent sealant.
 - b. Latex sealant.
 - c. Mortar.
 - d. Acrylic sealant.
 - e. Silicone sealant.
- K. Penetration Firestopping Systems for Groupings of Penetrants. Comply with the following:

1. Acceptable UL-Classified Systems with CAJ/CBJ/WL 8000 Series or other Systems meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Mortar.
 - c. Intumescent wrap strips.
 - d. Firestop device.
 - e. Intumescent composite sheet.
 - f. Pre-formed intumescent blocks.
 - g. Polyurethane firestop foam.

END OF SECTION

SECTION 07 84 43
JOINT FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Joints in or between fire-resistance-rated constructions.
- B. Joints at exterior curtain-wall/floor intersections.
- C. Joints in smoke barriers.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Include the following participants:
 - a. Contractor.
 - b. Architect.
 - c. Installers.
 - d. 3rd party inspectors.
 - e. Firestopping manufacturer.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
 - a. 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 engineering judgment or equivalent fire-resistance-rated assembly.
- B. Informational Submittals:
 - 1. Qualification Data: For Installer.
 - 2. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.
- C. Closeout Submittals:
 - 1. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
1. For systems that utilize a pre-formed firestop device, Installer shall be trained directly from manufacturer.
 2. For systems that require sealants, putties, or sprays a firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors", or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements" is required.

1.5 PROJECT 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 per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) Intertek Group in its "Directory of Listed Building Products."

2.2 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Basis-of-Design Products: The design for each fire-resistive joint system is based on products named in Part 2 articles. Subject to compliance with requirements, provide either the named products or comparable products by one of the following:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. RectorSeal.
 - d. Specified Technologies, Inc.
 - e. Tremco, Inc.
- B. Source Limitations:
 1. Obtain joint and penetration firestopping primary materials through one source from a single manufacturer with not less than ten years of successful experience in manufacturing principle materials described in this Section.
 2. Provide Secondary materials of type and from source recommended by manufacturer of primary materials.

2.3 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: 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 shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
 1. 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 at Exterior Curtain-Wall/Floor Intersections: Provide joint firestopping systems with rating determined per ASTM E 2307.
 1. F-Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.
- D. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 1. L-Rating: Not exceeding 5.0 cfm/ft. (0.00775 cu. m/s x m) of joint at both ambient and elevated temperatures.
- E. Joints at Intersection between Rated Wall Assemblies and Nonrated Horizontal Assemblies: Provide joint firestopping systems with ratings determined by ASTM E 2837.
- F. Mold Resistance: Provide joint firestopping with mold and mildew resistance rating less than or equal to 1 as determined by ASTM G21.
- G. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
 1. Sealant shall have a VOC content of 250 g/L or less.

- H. Accessories: Provide components of fire-resistive joint 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.

2.4 FILL MATERIALS

- A. Pre-Formed Top of Wall Firestopping:
 - 1. Acceptable Products:
 - a. CFS-TTS Firestop Top Track Seal by Hilti.
 - b. CFS-TTS MD Firestop Top Track Seal for Metal Deck by Hilti.
- B. Pre-Formed edge of Slab Firestopping:
 - 1. Acceptable Products:
 - a. CFS-EOS QS Edge of Slab QuickSeal by Hilti.
- C. Firestop Sealants: Single-Component formulations that do not re-emulsify after cure during exposure to Moisture.
 - 1. Acceptable Products:
 - a. CP 606 Flexible Firestop Sealant by Hilti.
- D. Firestop Water Based Spray: A sprayable water-based fire-rated mastic for construction joints. For use in top-of-wall joints, curtain wall/edge of slab, expansion joints.
 - 1. Acceptable Products:
 - a. CFS-CP WB Water-Based Acrylic Sealant Spray by Hilti.
- E. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions and Spray mastic formulation for use with a power sprayer. For use in top-of-wall joints, curtain wall/edge of slab, expansion joints.
 - 2. Acceptable Products:
 - a. CFS-S SIL SL (self-leveling), CFS-S SIL GG (gun grade), and CFS-SP SIL (spray mastic) by Hilti, Inc.

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 fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials 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 where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply 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 fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Elastomeric fill 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. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or 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 similar to "Warning - Penetration 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 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 fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.6 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.
 1. Equivalent approved systems by the following are acceptable:
 - a. Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under product category Expansion/Seismic Joints or Firestop Systems.
- B. Floor-to-Floor, Joint Firestopping Systems. Comply with the following:
 1. UL-Classified Systems: FF-D/S Systems or other System meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Assembly Rating: As indicated on Drawings.
 3. Nominal Joint Width: As indicated on Drawings
 4. Movement Capabilities: Class II compression, extension, or horizontal shear.
- C. Wall-to-Wall, Joint Firestopping Systems. Comply with the following:
 1. UL-Classified Systems: WW-D/S Systems or other System meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Assembly Rating: As indicated on Drawings.
 3. Nominal Joint Width: As indicated on Drawings
 4. Movement Capabilities: Class II compression or extension.
- D. Floor-to-Wall, Joint Firestopping Systems. Comply with the following:
 1. UL-Classified Systems: FW-D/S Systems or other System meeting the fire and smoke ratings specified or as indicated on Drawings.

- a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Assembly Rating: As indicated on Drawings.
 3. Nominal Joint Width: As indicated on Drawings
 4. Movement Capabilities: Class II compression, extension, or horizontal shear.
- E. Head-of-Wall, Fire-Resistive Joint Firestopping Systems. Comply with the following:
1. UL-Classified Systems: HW-D/S Systems or other System meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Assembly Rating: As indicated on Drawings.
 3. Nominal Joint Width: As indicated on Drawings
 4. Movement Capabilities: Class II compression or extension.
- F. Bottom-of-Wall, Joint Firestopping Systems. Comply with the following:
1. UL-Classified Systems: BW-D/S Systems or other System meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Assembly Rating: As indicated on Drawings.
 3. Nominal Joint Width: As indicated on Drawings
 4. Movement Capabilities: Class II compression or extension.
- G. Wall-to-Wall, Joint Firestopping Systems Intended for Use as Corner Guards. Comply with the following:
1. UL-Classified Systems: CG-D/S Systems or other System meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Assembly Rating: As indicated on Drawings.
 3. Nominal Joint Width: As indicated on Drawings
 4. Movement Capabilities: Class II compression or extension.
- H. Perimeter Joint Firestopping Systems. Comply with the following:
1. UL-Classified Perimeter Fire-Containment Systems: CW-D/S Systems or other System meeting the fire and smoke ratings specified or as indicated on Drawings.
 - a. Or an Engineered Judgments by one of the listed manufacturer's meeting the required rating.
 2. Assembly Rating: As indicated on Drawings.
 3. Linear Opening Width: As indicated on Drawings.
 4. Movement Capabilities: Class II compression or extension.
 5. F-Rating: As indicated on Drawings.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior horizontal traffic urethane joint sealants.
- B. Interior vertical and horizontal nontraffic joint sealants
- C. Latex joint sealants.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Joint sealants.
 - b. Joint sealant backing materials.
 - 2. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
 - 3. Joint-Sealant Schedule: Include the following information:
 - a. Joint-sealant application, joint location, and designation.
 - b. Joint-sealant manufacturer and product name.
 - c. Joint-sealant formulation.
 - d. Joint-sealant color.
- B. Informational Submittals:
 - 1. Test and Evaluation Reports:
 - 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.
2. Field Quality-Control Submittals:
 - a. Field-Adhesion-Test Reports: For each sealant application tested.
3. Sample warranties.
- C. Closeout Submittals:
 1. Warranty Documentation:
 - a. Manufacturers' special warranties.
 - b. Installer's special warranties.

1.4 QUALITY ASSURANCE

- A. Qualifications:
 1. Installers: Authorized representative who is trained and approved by manufacturer.
 2. Testing Agency: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

1.5 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.
 - a. Test Method: Test joint sealants in accordance with Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or 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.
 5. 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.
 6. 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.

1.6 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 (5 deg C).
 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.

1.7 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.
 2. Silicone Sealants Warranty Period: 20 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. VOC Content: Verify sealants and sealant primers comply with the following:
 - 1. Architectural sealants have a VOC content of 250 g/L or less.
 - 2. Sealants and sealant primers for nonporous substrates have a VOC content of 250 g/L or less.
 - 3. Sealants and sealant primers for porous substrates have a VOC content of 775 g/L or less.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 INTERIOR HORIZONTAL TRAFFIC URETHANE JOINT SEALANTS (**DESIGNATION U-TI**)

- A. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.
 - 1. Manufacturers:
 - a. Master Builders Solutions; MasterSeal-SL-1.
 - b. Pecora Corporation; NR-201.
 - c. Sherwin-Williams Company (The); Stampede 1SL.
 - d. Tremco Construction Products Vulkem 45SSL

2.4 INTERIOR VERTICAL AND HORIZONTAL NONTRAFFIC JOINT SEALANTS
(**DESIGNATION U-SC**)

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
1. Manufacturers:
 - a. Bostik, Inc.; Chem-Calk 915
 - b. Master Builders Solutions; MasterSeal-TX-1.
 - c. Pecora Corporation; Dynatrol I-XL.
 - d. Sherwin-Williams Company (The); Loxon-TX.
 - e. Sika Corporation; Silkaflex Textured Sealant.
 - f. Tremco Incorporated; Dymonic 100.

2.5 LATEX JOINT SEALANTS (**DESIGNATION L-GP**).

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
1. Manufacturers:
 - a. Master Builders Solutions; MasterSeal-NP 520.
 - b. Pecora Corporation; AC-20.
 - c. Sherwin-Williams Company (The); 950A.
 - d. Sika Corporation; Sil A 700.
 - e. 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) for all sealants, except silicone and horizontal joints. Type O (open-cell material) for silicone sealants. Provide size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Backings shall be approximately 25% larger than joint.
- 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 according to 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 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.

3.5 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.

3.6 JOINT-SEALANT SCHEDULE

- A. Interior joints in horizontal traffic surfaces (**Designation U-TI**):
 - 1. Joint Locations:
 - a. Where open gaps / joints occur between base and floor finishes.
 - b. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, S, P/NS, 25, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Interior joints in vertical surfaces and horizontal nontraffic surfaces (**Designation U-SC**):
 - 1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Vertical joints on exposed surfaces of unit masonry, concrete, walls and partitions.
 - c. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Urethane, S, P/NS, 25, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement (**Designation L-GP**):
 - 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.
 - c. Joints between interior wall surfaces and countertops and millwork.
 - d. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Acrylic latex.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

JOINT SEALANTS

07 92 00 - 8

SECTION 07 92 13

ACOUSTICAL JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Acoustical joint sealants.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Acoustical joint sealants.
 - 2. Samples for Verification: For each type and color of acoustical joint sealant required.
 - a. Size: 1/2-inch- (13-mm-) wide sealant joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
 - 3. Acoustical Joint-Sealant Schedule: Include the following information:
 - a. Joint-sealant application, joint location, and designation.
 - b. Joint-sealant manufacturer and product name.
 - c. Joint-sealant formulation.
 - d. Joint-sealant color.
- B. Informational Submittals:
 - 1. Test and Evaluation Reports:
 - a. Product Test Reports: For each type of acoustical joint sealant, for tests performed by qualified testing agency or manufacturer and witnessed by a qualified testing agency.
 - 2. Sample warranties.
- C. Closeout Submittals:
 - 1. Warranty Documentation:
 - a. Manufacturers' special warranties.
 - b. Installer's special warranties.

1.3 WARRANTY

- A. Installer's Special Warranty: Installer agrees to repair or replace acoustical 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. Manufacturer's Special Warranty: Manufacturer agrees to furnish acoustical 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: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 ACOUSTICAL JOINT SEALANTS

- A. Acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies in accordance with ASTM E90.
 - 1. Verify sealant has a VOC content of 250 g/L or less.
- B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 - 1. Manufacturers:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Hilti Incorporated; CP 506 Smoke and Acoustic Sealant.
 - d. Pecora Corporation; AC-20 FTR.
 - e. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - f. Tremco; Acoustical Sealant.
 - 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical 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 acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical joint-sealant manufacturer. 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 ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written instructions for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 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 acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical 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 acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior standard steel doors and 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 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - a. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
 - 2. Sustainable Design Submittals conforming to requirements listed in Section 01 81 13 "Sustainable Design Requirements":
 - a. If published, provide any of the following documentation: Product Declarations, Environmental Product Declarations (EPD's), GreenScreen v1.2 Benchmark, Health Product Declarations (HPD) or other documentation as defined in "Sustainable Design Requirements."
 - 1) Failure to provide the above documentation will disqualify products where this documentation is required for compliance to LEED; reference "Sustainable Design Requirements."
 - b. Materials and Resources: Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices.

- 1) Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 3. Shop Drawings: Include the following:
 - a. Elevations of each door type.
 - b. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - c. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - d. Locations of reinforcement and preparations for hardware.
 - e. Details of each different wall opening condition.
 - f. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - g. Details of anchorages, joints, field splices, and connections.
 - h. Details of accessories.
 - i. Details of moldings, removable stops, and glazing.
 - j. Samples for Verification:
 4. Fabrication: Prepare Samples approximately 12 by 12 inches (305 by 305 mm) to demonstrate compliance with requirements for quality of materials and construction:
 - a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
 - b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.
 5. 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.
- B. Informational Submittals:
1. Qualification Data: For door inspector.
 - a. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
 - b. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
 - c. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.
 2. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly, fire-rated borrowed-lite assembly, windborne-debris impact resistance door, and thermally-rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.
 3. Field quality control reports.
- C. Closeout Submittals:
1. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.6 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:

1.7 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 (102 mm high) wood blocking. Provide minimum 1/4-inch (6 mm) space between each stacked door to permit air circulation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. Ceco Door Products; an Assa Abloy Group company.
 - 2. Curries Company; an Assa Abloy Group company.
 - 3. Mesker Door Inc.
 - 4. Pioneer Industries, Inc.
 - 5. Republic Doors and Frames.
 - 6. Steelcraft; an Allegion company.
- B. Source Limitations:
 - 1. Obtain interior hollow-metal work from single source from single manufacturer.
 - 2. Obtain exterior hollow-metal work from single source from single manufacturer.

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 indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

1. 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. 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.
 3. Temperature-Rise Limit: Where indicated on drawings, provide doors that have a maximum transmitted temperature end point of not more than 450 degrees F (250 degrees C) above ambient after 30 minutes of standard fire-test exposure.
 4. FM Global approval Standard for Fire Doors, Class Number 4100.
- 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. Labeling Agency:
1. If labeling agency is Underwriters' Laboratories: Manufacture doors and frames under the UL factory inspection program and in strict compliance to UL procedures, and provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class.
 2. If labeling agency is Intertek Testing Services/Warnock Hersey: Manufacture doors and frames under the ITS/WH factory inspection program and in strict compliance to ITS/WH procedures, and provide the degree of fire protection capability indicated by the opening class.
 3. If labeling agency is FM Global: Manufacture doors and frames under the FM Global factory inspection program and in strict compliance to FM Global procedures, and provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class.
- D. Metal labels, bearing the name of the labeling agency, shipped on items located as follows:
1. Door Frames: Placed on the rabbet between the two upper hinge locations as to be concealed when doors are shut.
 2. Doors: Placed on the hinge stile between the two upper hinge locations as to be concealed when doors are shut.
 3. Window frames: Placed on the public side rabbet approximately 5 ft above finished floor - do not place on the face of the frame.
- E. The following label materials/methods will not be acceptable and will be cause for rejection of all work of this Section:
1. Paper or plastic labels.
 2. Stamped or embossed label markings.
 3. Loose labels to be applied at the site.
- F. Provide stairway doors to meet 250 degrees F (139 degrees C) Rise Class criteria minimum.

- G. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for Wind Zone 1 for Basic protection.
 - 1. Large-Missile Test: For glazed openings located within 30 feet (9.1 m) of grade.
- H. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.40 deg BTU/F x h x sq.ft. (2.16 W/K x sq.m) 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.
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm) .
 - c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch (18 ga.) (1.0 mm).
 - d. Edge Construction: Model 1, Full Flush.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Non-Fire Rated Core: Manufacturer's standard, non-foam core.
 - g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors.
 - 1) Fire Rating: As indicated on drawings, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - (a) Temperature-Rise Rating (TRR) Across Door Thickness: 250 degrees F (139 degrees C).
 - (b) Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - (c) Attach fire rating label to each fire rated unit.
 - h. Reinforcing: Channel shaped vertical stiffeners at 6 inches (152 mm), welded to both sheets.
 - i. Top Closures for Doors in Sterile Environments: Flush with top of faces and edges.
 - 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (16 ga.) (1.3 mm).
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Face welded.
 - 3. Exposed Finish: Primed and field finished.
- C. Extra-Heavy-Duty Doors and Frames (Sound Rated): ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.

- b. Thickness: 1-3/4 inches (44.5 mm).
 - c. Face: Uncoated steel sheet, minimum thickness of 0.053 inch (16 ga.) (1.3 mm).
 - d. Edge Construction: Model 1, Full Flush.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Core Material: Manufacturer's standard construction as required to meet acoustic requirements indicated.
 - g. Sound Transmission Class (STC) Rating of Door and Frame Assembly: STC of 35, calculated in accordance with ASTM E413, and tested in accordance with ASTM E90.
 - h. Sound Seals: Integral, concealed in door and/or frame.
 - i. Opening Force of Sound-Rated Doors, Non-Fire Rated: 5 lbs. (2.27 kg), maximum, in compliance with ADA Standards.
2. Frames:
- a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (16 ga.) (1.3 mm).
 - b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
 - c. Construction: Face welded.
3. Exposed Finish: Primed and field finished.

2.4 EXTERIOR 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. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm).
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (16 ga.) (1.3 mm), with minimum A60 (ZF180) coating.
 - d. Edge Construction: Model 1, Full Flush.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Top Closures for Outswinging Doors: Flush with top of faces and edges.
 - i. Core: Manufacturer's standard polyurethane.
 - 1) Reinforcing: 20 gage channel shaped or hat shaped vertical stiffeners at 6 inches (152 mm) oc, welded to both sheets.
 - 2) Insulating Value: U-value of 0.38, when tested in accordance with ASTM C1363.
 - 2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch (14 ga.) (1.7 mm), with minimum A60 (ZF180) coating.
- b. Construction: Face welded.
3. Exposed Finish: Primed and field finished.

2.5 BORROWED LITES

- A. Fabricate of same material and face dimensions to match door frames.
 1. Welds: Continuously weld joints along all surfaces along the throat of the frames. Grind and finish all exposed surfaces of joints so that no traces of the mitered joints are visible. Frames showing traces of mitered joints are not acceptable.
- B. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.
- C. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.6 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 (610 mm) of frame height above 7 feet (2.1 m).
 3. Postinstalled Expansion Anchor: Minimum 3/8-inch (9.5 mm) 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 (51 mm) height adjustment. Terminate bottom of frames at top of underlayment.
- D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) 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.

2.7 MATERIALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

- C. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- D. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.
- F. 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.
- G. 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.
- H. Glazing: Comply with requirements in Section 08 80 00 - Glazing.

2.8 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 (19 mm) 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, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115W 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 butted or 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 (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.9 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.
 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 (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), 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.
 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.3 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

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 SUBMITTALS

A. Action Submittals:

1. Product Data: For each type of product, including the following:
 - a. Door core materials and construction.
 - b. Door edge construction
 - c. Door face type and characteristics.
 - d. Door trim for openings.
 - e. Factory-machining criteria.
 - f. Factory-finishing specifications.
2. 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:
 - a. Door schedule indicating door location, type, size, fire protection rating, and swing.
 - b. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
 - c. Details of frame for each frame type, including dimensions and profile.
 - d. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
 - e. Dimensions and locations of blocking for hardware attachment.
 - f. Dimensions and locations of mortises and holes for hardware.
 - g. Clearances and undercuts.
 - h. Requirements for veneer matching.
 - i. Doors to be factory finished and application requirements.
3. Samples for Verification:

B. Informational Submittals:

1. Qualification Data: For door inspector.
 - a. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Field quality-control reports.
3. Sample Warranty: For special warranty.

- C. Closeout Submittals:
 - 1. Special warranties.
 - 2. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: 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 (16 and 32 deg C) and relative humidity between 43 and 70 percent during remainder of construction period.

1.6 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. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - 2. Warranty shall also include 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 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors indicated to be blueprint matched with paneling from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood 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 UL 10C or NFPA 252.

1. Temperature-Rise Limit: Where indicated on Drawings, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards." and ANSI/WDMA I.S. 1A, whichever is stricter.

2.4 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: Flush rectangular beads.
- 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.

2.5 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."

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 (3.2 mm in 2400 mm).
 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 fire-rated doors and frames in accordance with NFPA 80.
- 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 (3.2 mm) at heads, jambs, and between pairs of doors.

- b. Provide 1/8 inch (3.2 mm) 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 (6.4 mm) 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 (3-1/2 degrees) at lock and hinge edges.
 - 6. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) 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.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: 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.
- 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

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Storefront framing for punched openings.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 SUBMITTALS

A. Action Submittals:

1. Product Data: For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - a. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - b. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
 - 1) Joinery, including concealed welds.
 - 2) Anchorage.
 - 3) Expansion provisions.
 - 4) Glazing.
 - 5) Flashing and drainage.
 - c. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
3. Delegated-Design Submittal: Aluminum-framed entrances and storefront systems, including support framing, connections, and related hardware shall be designed under the direct supervision of a Professional Structural Engineer experienced in the design of the work and licensed in the State of Illinois, using performance and design criteria, and requirements specified in this Section.

B. Informational Submittals:

1. Qualification Data: For Installer and laboratory mockup testing agency.
2. Energy Performance Certificates: For aluminum-framed entrances and storefronts, accessories, and components, from manufacturer.

- a. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance and storefront.
 3. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
 4. Quality-Control Program: Developed specifically for Project, including fabrication and installation, according to recommendations in ASTM C 1401. Include periodic quality-control reports.
 5. Source quality-control reports.
 6. Field quality-control reports.
 7. Sample Warranties: For special warranties.
- C. Closeout Submittals:
1. Maintenance Data: For aluminum-framed entrances and storefronts 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.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.
- 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.

1.5 WARRANTY

- A. Special Warranty: Manufacturer and Installer agree(s) to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a Professional Structural Engineer licensed in the State of Illinois, as defined in Section 01 40 00 - Quality Requirements, to design aluminum-framed entrances and storefronts.
- B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, 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. Structural Loads:
 - 1. Wind Loads: Provide entrances and storefront construction to resist positive and negative design pressures in accordance with the local building code, but not less than 30 pounds per sq. ft.
 - 2. Uniform Load Deflection Test: When tested in accordance with ASTM E 330, storefront deflection under load is to not exceed $L/175$ of the clear span.
 - 3. Uniform Structural Load Test: When tested in accordance with ASTM E 330, at 1.5 times the wind load pressure, there is to be no glass breakage, permanent damage to fasteners or deflection set.
- D. Deflection of Framing Members: At design wind pressure, as follows:
 - 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding $1/175$ of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to $3/4$ inch (19.1 mm), whichever is less.
 - 2. Deflection Parallel to Glazing Plane: Limited to $1/360$ of clear span or $1/8$ inch (3.2 mm), whichever is smaller.
- E. Structural: Test according to ASTM E 330 as follows:
 - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- F. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
 1. Storefront: When tested in accordance with ASTM E 283 at a static pressure of 6.24 psf, air infiltration is not to exceed 0.06 cfm per square foot of fixed wall area.
- G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
 1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- H. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
 1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
 2. Maximum Water Leakage: According to AAMA 501.1. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- I. Energy Performance: Certify and label energy performance according to NFRC as follows:
 1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.36 Btu/sq. ft. x h x deg F (2.55 W/sq. m x K) as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.38 as determined according to NFRC 200.
 3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 15 as determined according to NFRC 500.
- J. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), 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 according to AAMA 501.5.
 - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F (82 deg C).
 - b. Low Exterior Ambient-Air Temperature: 0 deg F (minus 18 deg C).
 - c. Interior Ambient-Air Temperature: 75 deg F (24 deg C).

2.2 MANUFACTURERS

- A. Tubelite

- B. Basis of Design: Tubelite t-14000 thermal storefront
- C. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 - 1. Construction: Nonthermal.
 - 2. Glazing System: Retained mechanically with gaskets on four sides.
 - 3. Glazing Plane: Front.
 - 4. Finish: High-performance organic finish.
 - 5. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
 - 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.
 - 2. Steel Reinforcement: 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 according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
 - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 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.
- D. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L.

2.5 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 (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.6 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.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Storefront Framing: Fabricate components for assembly using shear-block system.
- F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.7 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent pvdf resin by weight in both color coat and clear topcoat. prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Dark Bronze to match existing.

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

- A. General:
1. Comply with manufacturer's written instructions.
 2. Do not install damaged components.
 3. Fit joints to produce hairline joints free of burrs and distortion.
 4. Rigidly secure nonmovement joints.
 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
 6. Seal perimeter and other joints watertight unless otherwise indicated.
- B. 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.
- C. Set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 - Joint Sealants to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install glazing as specified in Section 08 80 00 - Glazing.
- F. Install weatherseal sealant according to Section 07 92 00 - Joint Sealants and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

3.3 ERECTION TOLERANCES

- A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
 2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
 - c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
 4. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish hardware required to adequately trim, hang, and operate all doors, as is hereinafter specified and listed in the Hardware Schedule.
 - 1. Provide hardware for doors and frames of unusual profile or shape or other special conditions.
 - 2. Provide all necessary standard and special fasteners, screws, bolts, expansion shields or anchors to properly secure hardware to its intended door, frame, or other surface.

1.2 REFERENCE STANDARDS

- A. The following reference standards and model code documents shall be used in estimating and detailing door hardware, and shall be considered as a standard of quality, function, and performance, as applicable:
 - 1. IBC 2000 Edition.
 - 2. NFPA-80 Fire Doors & Windows (current year adopted).
 - 3. NFPA-101 Life Safety Code (current year adopted).
 - 4. NFPA-105 Smoke Control Door Assembly. (current year adopted)
 - 5. ANSI-117.1 1992 Edition Providing Accessibility and Usability for Physically Handicapped People.
 - 6. ADAAG Americans with Disabilities Act Accessibility Guidelines.
 - 7. TAS Texas Accessibility Standards.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. General: Submit the following in accordance with Section 01 31 00 - Project Management and Coordination.
 - 2. Product Data: Provide a catalog cut sheet, clearly marked and identified, illustrating and describing each product included in the Hardware Schedule.
 - a. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
 - b. Formulate catalog cut sheets into sets and include a set with each copy of the Hardware Schedule submitted.
 - 3. Door Hardware Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

- a. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - b. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
 - c. Content: Include the following information:
 - 1) Type, style, function, size, label, hand, and finish of each door hardware item.
 - 2) Complete designations of every item required for each door or opening including name and manufacturer.
 - 3) Fastenings and other pertinent information.
 - 4) Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule. Use same scheduling sequence and format and use same door numbers and hardware set numbers as in the Contract Documents.
 - 5) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 6) Mounting locations for door hardware.
 - 7) Door and frame sizes and materials.
 - 8) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - d. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other Work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
4. Wiring Diagrams: For electrified hardware items specified for this Project, Provide complete wiring diagrams along with riser drawings and elevations, showing locations where such material is to be installed. Wiring Diagrams shall be submitted with Hardware Schedule. Verify and coordinate with the electrical systems installer. Integration shall take effect into central system as specified by Owner.
- a. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
 - b. Sequence of Operation: Include description of component functions that occur in the following situations:
 - 1) authorized person wants to enter;
 - 2) authorized person wants to exit;
 - 3) unauthorized person wants to enter;
 - 4) unauthorized person wants to exit.
5. Samples for Verification: If so requested by the Architect, provide a sample of any product or item requested, properly marked and tagged, for the opening for which it is intended.
- B. Informational Submittals:

- C. Operation and Maintenance Data: For each type of door hardware to include in maintenance manuals. Provide latest, revised and updated schedule of finish hardware, complete with catalog cuts and keying schedule. In addition, furnish one (1) copy of maintenance and parts manuals for those items for which they are readily available and normally provided.
 - a. Submit in accordance with provisions of Section 01 78 23 - Operation and Maintenance Data.

1.4 QUALITY ASSURANCE

- A. Substitutions: Request for substitutions for alternative hardware items will not be accepted on this Project unless specifically indicated. Specification indicates one (1) specified product, listed hereinafter in the Hardware Schedule, and two (2) acceptable alternative manufacturers for that product. If any specified product is listed as a "No Substitution" product, only that specified product shall be provided as indicated.
- B. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
 - 1. The hardware supplier shall be engaged regularly in the furnishing, delivery and servicing of contract builder's hardware and must be experienced and knowledgeable in all phases of estimating, detailing, scheduling, masterkeying, shipping and installation practices.
 - 2. When electro-mechanical or electronic hardware is supplied, a qualified individual with a minimum five- (5) year's experience shall be available for assistance.
- D. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and 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.
- E. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
- F. Regulatory Requirements: Comply with provisions of the following:
 - 1. Provide hardware that complies with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," and ANSI A117.1.
- G. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

- H. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- I. Keying Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 - Project Management and Coordination. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - 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. Address for delivery of keys.
 - 5. Location of Key Cabinet.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Marking and Packaging: All items of hardware shall be delivered to the site in manufacturer's original cartons or boxes. Each item of hardware shall be marked with the abbreviation set forth on the Shop Drawings to ensure that the product reaches its installation destination without needing specific hardware product number knowledge.
- B. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- C. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system, as applicable.

1.7 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

- B. Maintenance Service: If there are any products listed hereinafter that normally require a maintenance or service contract, provide the Owner and Architect with details and costs of standard maintenance or service contract.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Hardware Schedule" Article.
 - B. Product manufacturers listed with an asterisk (*) denote the specified manufacturers listed in the Hardware Schedule. The remaining two (2) listed manufacturers will be acceptable substitutions. If only one manufacturer is listed this shall be considered a "No Substitution" specification as set forth in "Quality Assurance" Article, for that particular item.

2.2 MATERIALS

- A. Screws and Fasteners: Provide all screws and fasteners of the proper size and type to properly anchor or attach the item of hardware scheduled. Provide all fasteners with Phillips heads, unless security type screws (spanner-head or torx-head) are hereinafter specified.
- B. Hinges: Provide as follows:
1. On doors to exterior openings and main corridor doors, and other doors of high frequency use, provide a continuous, gear type hinge of appropriate weight.
 2. Where regular ball bearing hinges are listed for other doors, provide one hinge for each 30-inch of door height.
 3. The width of the hinges shall be sufficient to clear all trim that is mounted to the doorframe.
 4. Hinges shall be guaranteed for life of opening if installed per manufacturer's recommendations.
 5. Acceptable Manufacturers:
 - a. Hager.
 - b. Stanley.
 - c. McKinney.

- C. Continuous Hinges: Continuous hinges shall consist of three (3)-interlocking extrusions in a pinless assembly applied to the full height of the door. All continuous geared hinges shall be manufactured to template screw locations and be non-handed. All mortise hinges and half mortise hinges shall cover and wrap the door edge completely. Doorframe heads shall be extended for clearance on full or half mortise hinges versus downsizing doors for ease of repair and replacement. All frames shall be properly reinforced per manufacturer's standards.
1. Standard warranty shall be for the life of opening.
 2. Acceptable Manufacturers:
 - a. Pemko.
 - b. Select.
 - c. Roton.
- D. Locks: All locks shall incorporate a seven pin tumbler system and be keyed to a GRANDMASTER SYSTEM as not to breach security of system in place. Keying system must be guaranteed of no duplication of existing change keys, master keys or grandmaster keys located in this Project. All keying shall be coordinated with Owner. Locks shall be Grade 1 mortise and/or cylindrical as hereinafter listed in the Hardware Schedule.
1. Acceptable Manufacturers:
 - a. Best.
 - b. Sargent.
 - c. Schlage.
- E. Lock Trim: Cylindrical/mortise locks are to be furnished with lever handle trim, with levers having a return to within 1/2 inch of the door face, as is hereinafter listed in the Hardware Schedule.
- F. Electronic Cylindrical Lockset: Heavy-duty lever handled, Grade 1, cylindrical lockset for commercial, industrial and institutional applications. Lockset shall combine key-in-lever design with motorized, programmable, stand-alone electronics for high security access control, which require no external wiring. Entry shall be by keypad.
1. Acceptable Manufacturers:
 - a. Schlage/Locknetics.
 - b. _____.
- G. Flush Bolts: Manual flush bolts to have 12-inch rods for doors 7'-6". Doors over 7'-6" high shall have bolts with top rods of 18 inch or 24 inch to allow ease of access to bolt lever. Furnish dust proof strikes for all bottom bolts.
1. Acceptable Manufacturers:
 - a. Ives.
 - b. Trimco.
 - c. Hager.
- H. Push/Pull Latch: Push/Pull Latch shall be U.L. listed for use on fire doors and provide secure and silent latching action. Provide with ANSI 115.1 strike.
1. Acceptable Manufacturers:
 - a. Glynn Johnson.
 - b. Hager.
 - c. Sargent.

- I. PRO Exit Trim/Exit Device: Keypad entry trim shall be a stand-alone, battery operated exit trim that is UL listed and tested for use with specified exit device.
 - 1. Acceptable Manufacturers:
 - a. Von Duprin.
 - b. No substitutions.
- J. Power Supply: Power supply shall integrate with selected switching for maintained switching with an emergency interface relay wired into the fire alarm system to insure fail secure application. Battery backup shall be included to produce backup power at full load during power failure.
 - 1. Acceptable Manufacturers:
 - a. Von Duprin.
 - b. _____.
- K. Card Reader/Controller: Access credential reader shall be capable of reading keypad codes to insure flexibility of control and management.
 - 1. Acceptable Manufacturers:
 - a. Locknetics.
 - b. No substitutions.
- L. Door Closers: Door closers shall be of cast iron and rectangular design, furnished with a full cover. Provide complete with backcheck, delayed action and hold-open as indicated. Closers shall be mounted out of the line of sight wherever possible (i.e., room side of corridor doors, etc.) with parallel arm mounting on out-swinging doors. Mount closers to jamb or on brackets and/or drop plates, where special conditions require.
 - 1. Acceptable Manufacturers:
 - a. LCN.
 - b. Sargent.
- M. Push Plates: Push plates are to be .050 brass, bronze or stainless steel with four (4) beveled edges, drilled and countersunk for screws, as is hereinafter specified in the Hardware Schedule.
 - 1. Acceptable Manufacturers:
 - a. Ives.
 - b. Trimco.
 - c. Hager.
- N. Door Pulls: Door pulls shall be ADA compliant with a 2 1/2 inch projection from back of pull to face of door. All door pulls shall be thru-bolted or back-to-back mounted.
 - 1. Acceptable Manufacturers:
 - a. Ives.
 - b. Trimco.
 - c. Hager.
- O. Protective Plates: Protective plates shall be mop (6"), kick (10") or armor (34") and shall be minimum .050 thick brass, bronze, or stainless steel, with three (3) beveled edges, drilled and countersunk for screws. Plates shall be mounted to avoid louvers and/or glass kits.
 - 1. Acceptable Manufacturers:
 - a. Ives.

- b. Trimco.
 - c. Hager.
- P. Door Stops and Holders: Where a door strikes a wall at approximately 90 degrees, a suitable door stop shall be provided, either a wall bumper or floor stop. Where doors are undercut, provide floor stops with adequate height to properly stop the door. If door would not otherwise strike a wall, an overhead stop shall be provided. In-wall blocking for wall bumpers at stud walls shall be provided in accordance with Section 06 10 53 - Miscellaneous Carpentry. Provide reinforcing in frame and door for overhead stops.
 - 1. Acceptable Manufacturers:
 - a. Ives.
 - b. Hager.
 - c. Glynn-Johnson.
- Q. Thresholds and Weatherstrip: Weatherstripping to have aluminum housing, specified insert, and elongated mounting holes. Door sweeps shall be surface mounted, of aluminum/stainless steel housing with specified insert. Overhead drip caps to be of aluminum, have a 2 1/2-inch projection and be 4 inches wider than the door opening. Thresholds shall be of saddle type with no more than 1/2 inch rise. Weatherstripping and smoke seals shall be surface-mounted on doorstep and have 1/4" adjustment slots.
 - 1. Acceptable Manufacturers:
 - a. Pemko.
 - b. Hager.
 - c. NGP.
- R. Wall Magnets: Magnets shall be fail safe and hold until the current is interrupted. Current input shall be factory selected to be 24V AC/DC or 120V AC and be protected against voltage surges up to 600 volts. If voltage less than 120 VAC is indicated, provide transformers as required to accommodate power supply on specified magnets. Maximum holding force shall be forty (40) pounds. Magnet covers shall be of metal composite. Plastic covers will not be accepted.
 - 1. Acceptable Manufacturers:
 - a. LCN.
 - b. ABH.
 - c. Dorma.
- S. Push Button Switch: Push button switch assembly shall be a momentary action switch used as a redundant means of egress. Mount in single gang electrical box.
 - 1. Acceptable Manufacturers:
 - a. Locknetics.
 - b. _____.
- T. Electromagnetic Locks (Access Control): Electromagnetic lock shall have a 1500 lb. holding force containing a built in passive infrared (PIR) sensor to energize the magnetic lock when a person enters its field of view. Lock shall contain a built-in lighted emergency exit button as a redundant means of de-energizing lock. An access control system shall be integral to the lock with keypads/readers easily wired directly to the lock.
 - 1. Acceptable Manufacturers:

- a. Locknetics.
 - b. _____.
- U. Power Supply: Designed and fabricated to interface with all designated electrical security components with no additional hardware. Power supplies shall be Underwriter Laboratories (UL) listed for general-purpose use tested to meet UL 1012 specifications. Power supplies shall have 12/24VDC field selectable output voltage. Output current shall be 1 Amp at 12VDC and 1 Amp at 24VDC. When required, interfacing to an emergency alarm system shall terminate power supply output. Power supply output voltage shall be filtered and regulated.
- 1. Power supply shall be housed in a standard NEMA 1 enclosure with additional space for a minimum of four (4) 4 Amp/hour batteries providing battery back up when required. An integral battery charging circuit shall be standard. Provide key locking cover to prevent tampering.
 - 2. Basis of Design Product:
 - a. Locknetics Security Engineering Model 510
 - b. _____.
- V. Select Entry System: Select Entry shall be electrostatically protected to 20KV. LED status indication for programming entry status and self-diagnostics. Operating temperature shall be -40 degree F to +150 degree F. Controller shall possess a nonvolatile memory and user codes shall be from three (3) to eight (8) digits long with selectable keypad or proximity. Other features shall include "timers" for relock and door prop time, adjustable 0-255 seconds.
- 1. Acceptable Manufacturers:
 - a. Locknetics.
 - b. _____.
- W. Intumescent Seal: Intumescent seal shall comply with door and frame manufacturers for positive pressure tests for fire and smoke. (UBC 7-2, Parts 1 & 2/UL10C).
- 1. Acceptable Manufacturers:
 - a. Pemko.
 - b. Reese.
 - c. NGP.

2.3 FINISHES

- A. Hardware finishes shall match and be maintained to BHMA symbols, as indicated in the Hardware Schedule. Strict adherence to base metals and finish is required.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
 - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107 or ANSI A250.6, whichever is more stringent.
- B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

- A. Installation shall be by a qualified installer with a minimum five (5) year's experience in the installation of commercial grade hardware. Manufacturer's instructions shall dictate templating and installation.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- C. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- D. Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.
- E. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect prior to installation.

- F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

- A. Perform final inspection with hardware installer and hardware supplier present to ensure correct installation and operation, and check for any damaged or defective items. Observe and inspect that all hardware has been installed to its correct destination in proper working order.
- B. Independent Architectural Hardware Consultant: Owner reserves the right to engage a qualified independent Architectural Hardware Consultant to perform a separate independent inspection and to prepare an inspection report.

3.5 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.
 - 1. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- B. At completion of the installation and prior to Substantial Completion, make final adjustments to door closures and other items of hardware. Leave all hardware clean and fully operable. Should any item be found to be defective, it shall be repaired or replaced as directed.
- C. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary 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.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

3.8 MANUFACTURER'S ABBREVIATIONS

- A. Abbreviations that could be used within Door Hardware Schedule.
 1. ADA Adams Rite
 2. HAG Hagggar
 3. IVE Ives
 4. LCN LCN
 5. LOC Locknetics
 6. MCK McKinney
 7. NGP National Guard Products
 8. PEM Pemko
 9. ROT Roton
 10. SAR Sargent
 11. SCH Schlage
 12. SDC Security Door Controls
 13. SEC Securitron
 14. SEL Select
 15. STA Stanley
 16. TRI Trimco
 17. UNK Unknown
 18. VON Von Duprin

3.9 HARDWARE SCHEDULE

SET: 1

3 Hinge		TA2714 4-1/2" x 4-1/2"	US26D MK	1 Push
Plate	70F (8" x 16")	630 RO		
1 Pull Plate		110x70C	630	RO
1 Electric Strike		1500C	630	HS
1 Smart Pac Bridge Rectifier		2005M3		HS
1 Automatic Opener	6061		689	NO
1 Kick Plate		K1050 8" high 4BE CSK	US32D RO	
1 Wall Stop		400	US26D RO	
1 H & J Smoke / Sound Seal Set	S88D			PE
1 Wiring Diagram		By Electrical Contractor		OT
1 Electrolynx Harness		QC-C1500P (hinge/strike to power)	MK	
1 Power Supply		AQL series		SU

SET: 2

3 Hinge		TA2714 4-1/2" X 4-1/2"	US26D	MK
1 Push Plate	70F (8" X 16")	630	RO	
1 Pull Plate		110X70C	630	RO
1 Surface Closer		P7500 (par. arm)	689	NO
1 Kick Plate		K1050 8" high 4BE CSK	US32D	RO
1 Wall Stop		400	US26D RO	
3 Silencer		608		RO

END OF SECTION

SECTION 08 71 13
AUTOMATIC DOOR OPERATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

1.2 DEFINITIONS

- A. AAADM: American Association of Automatic Door Manufacturers.
- B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.
- C. Double-Egress (Doors): A pair of doors that simultaneously swing with the two doors moving in opposite directions with no mullion between them.
- D. Double-Swing (Doors): A pair of doors that swing with the two doors moving in opposite directions with a mullion between them; each door functioning as a single-swing door.
- E. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.
- F. For automatic door terminology, see BHMA A156.10 and BHMA A156.19 for definitions of terms.

1.3 COORDINATION

- A. Coordinate sizes and locations of recesses in concrete floors for recessed control mats that control automatic door operators. Concrete, reinforcement, and formwork requirements are specified elsewhere.
- B. Templates: Distribute for doors, frames, and other work specified to be factory prepared and reinforced for installing automatic door operators.
- C. Coordinate hardware for doors with operators to ensure proper size, thickness, hand, function, and finish.
- D. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to power supplies and access-control system.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.

- a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door operators.
- b. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Shop Drawings: For automatic door operators.
 - a. Include plans, elevations, sections, hardware mounting heights, and attachment details.
 - b. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - c. Indicate locations of activation and safety devices.
 - d. Include diagrams for power, signal, and control wiring.
 - e. Include plans, elevations, sections, and attachment details for guide rails, if required.

B. Informational Submittals:

1. Qualification Data: For Installer.
2. Product Certificates: For each type of automatic door operator.
3. Sample Warranties: For manufacturer's special warranties.

C. Closeout Submittals:

1. Maintenance Data: For automatic door operators, safety devices, and control systems, to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain automatic door operators, including activation and safety devices, from single source from single manufacturer.
- B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project.
 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Faulty or sporadic operation of automatic door operator, including controls.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.
 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 AUTOMATIC DOOR OPERATORS, GENERAL

- A. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated; and according to UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.
 - 1. Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.
 - 2. Wind Load: Provide door operators on exterior doors that will open and close doors and maintain them in fully closed position when subjected to wind load of 30 MPH wind velocity or equivalent inward differential pressures.
- B. Electromechanical Operating System: Self-contained unit powered by permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, connections for power and activation- and safety-device wiring, and manual operation including spring closing when power is off.
- C. Hinges: Reference Section 08 71 00 - Door Hardware for hinge type for each door that door operator shall accommodate.
- D. Cover for Surface-Mounted Operators: Fabricated from 0.125-inch- (3.2-mm-) thick, extruded or formed aluminum; manufacturer's standard width; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.
- E. Brackets and Reinforcements: Fabricated from aluminum with nonstaining, nonferrous shims for aligning system components.
- F. Fire-Door Package (if required): Consisting of UL-listed latch mechanism, power-reset box, and caution signage for fire-rated doors. Latch mechanism shall allow door to swing free during automatic operation; when fire is detected, latch actuator shall cause exit hardware to latch when door closes. Provide latch actuators with fail-secure design.
- G. 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 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extrusions: ASTM B 221 (ASTM B 221M).
 - 2. Sheet: ASTM B 209 (ASTM B 209M).
- B. Expanded Aluminum Mesh: Expanded and flattened aluminum sheet according to the geometry of ASTM F 1267.

- C. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.3 CONTROLS

- A. General: Provide controls, including activation and safety devices, according to BHMA standards; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.
- B. Motion Sensors: Self-contained, K-band-frequency, microwave-scanner units; fully enclosed in plastic housing; adjustable to provide detection field sizes and functions required by BHMA A156.10.
 - 1. Provide capability for switching between bidirectional and unidirectional detection.
 - 2. For one-way traffic, sensor on egress side shall not be active when doors are fully closed.
- C. Presence Sensors: Self-contained, active-infrared scanner units; adjustable to provide detection field sizes and functions required by BHMA A156.10. Sensors shall remain active at all times.
- D. Push-Plate Switch: Momentary-contact door control switch with flat push-plate actuator with contrasting-colored, engraved message.
 - 1. Configuration: Rectangular push plate with 2-by-4-inch (50-by-100-mm) junction box.
 - a. Mounting: Recess mounted, semiflush in wall.
 - 2. Push-Plate Material: Stainless steel.
 - 3. Message: "Push to Open."
- E. Key Switch: Recess-mounted, door control switch with key-controlled actuator; enclosed in 2-by-4-inch (50-by-100-mm) junction box. Provide faceplate engraved with text indicating switch functions.
 - 1. Faceplate Material: Stainless steel.
 - 2. Functions: Two-way automatic, hold open, one-way exit, and off.
 - 3. Mounting: Recess mounted in door jamb.
- F. Wireless or Remote Radio-Control Switch: Radio-control system consisting of header-mounted receiver and wall-mounted transmitter switch.
 - 1. Wall-Mounted Transmitter Switch: One red-button, momentary-contact actuator enclosed in 4-by-4-inch (100-by-100-mm) junction box. Provide blue plastic cover engraved with "Press Button to Open" in white text and with international symbol of accessibility.
- G. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.4 FABRICATION

- A. Factory fabricate automatic door operators to comply with indicated standards.

- B. Form aluminum shapes before finishing.
- C. Fabricate exterior components to drain condensation and water passing joints within operator enclosure to the exterior.
- D. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

2.5 ACCESSORIES

- A. Signage: As required by cited BHMA standard for type of door and its operation.
 - 1. Application Process: Operator manufacturer's standard process.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.
- B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, and other conditions affecting performance of automatic door operators.
- B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic door operator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Access Control System: Connect operators to access control system as specified in Division 28 Access Control Sections.
- E. Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

3.2 ADJUSTING

- A. Adjust automatic door operators to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.
 - 1. Adjust operators on exterior doors for weathertight closure.
- B. After completing installation of automatic door operators, inspect exposed finishes on doors and operators. Repair damaged finish to match original finish.
- C. Readjust automatic door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).
- D. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.3 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include three months' full maintenance by skilled employees of automatic door operator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
 - 2. Perform maintenance, including emergency callback service, during normal working hours.
 - 3. Include 24-hour-per-day, 7-day-per-week, emergency callback service.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

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 according to ASTM C1036.
- C. IBC: International Building Code.

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.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.
 - 3. Glazing Accessory Samples: For sealants, in 12-inch (300-mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
 - 4. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
 - 5. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Informational Submittals:
 - 1. Qualification Data: For Installer, manufacturers of insulating-glass units with sputter-coated, low-E coatings, and sealant testing agency.
 - 2. Product Certificates: For glass.

3. Product Test Reports: For tinted glass, coated glass, insulating glass, and glazing sealants, for tests performed by a qualified testing agency.
 - a. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
4. Preconstruction adhesion and compatibility test report.
5. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. 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.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to 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 (4.4 deg C).

1.8 WARRANTY

A. INSULATING GLASS UNITS:

1. Provide insulating glass unit manufacturer's written warranty for the insulating glass units to be free of visual obstruction due to internal moisture or dust collecting on the interior glass surfaces.
2. Provide warranty in accordance with the general conditions, except the warranty period is to be for ten (10) years instead of one (1) year.
3. Provide warranty signed by the subcontractor and insulating glass manufacturer with copies submitted to the architect.

- B. The above warranty are in addition to, and not a limitation of, other rights the owner may have under the contract documents.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

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 the following: 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 according to the IBC and ASTM E1300.
1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE 7, based on heights above grade indicated on Drawings.
 - a. Wind Design Data: As indicated on Drawings.
 2. Design Snow Loads: As indicated on Drawings.
 3. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
 4. Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.

5. 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 (25 mm), whichever is less.
 6. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

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.
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction 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 the thickness indicated.
1. Minimum Glass Thickness for Exterior Lites: 1/4-inch (6 mm).
 2. Minimum Glass Thickness for Interior Lites up to 48-inches tall: 1/4-inch (6 mm).
- 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

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. Sealant shall have a VOC content of 250 g/L or less.
 4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
1. Manufacturers:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. May National Associates, Inc.; a subsidiary of Sika Corporation.
 - d. Pecora Corporation.
 - e. Sika Corporation.
 - f. Tremco Incorporated.
 2. Applications: Window perimeters or panel to panel joints. To coat over end dams or other internal seals in curtain wall systems.

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 C 1281 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 the 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, with requirements of 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: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.8 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 (67 deg C), ambient; 180 deg F (100 deg C), 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.

2.9 GLAZING SCHEDULE

- A. Glass Type GL-1 (Insulated Vision Units): Minimum one (1) inch thick, clear glass insulated units with Low-E coating on surface #2. Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with testing requirements in 16 CFR 1201 and ANSI Z97.1, and heat strengthened or tempered to comply with wind load requirements.

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 (1270 mm).
 - 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 (3-mm) 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 according to 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 by gasket manufacturer.

3.4 TAPE GLAZING (INTERIOR USE ONLY)

- 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 where indicated on Drawings.
- 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.

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 Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket 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. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. 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 by gasket manufacturer.
- E. 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 come into 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.

END OF SECTION

SECTION 08 83 00

MIRRORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. The following types of silvered flat glass mirrors:

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - a. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
 - 2. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.
- B. Informational Submittals:
 - 1. Qualification Data: For Installer.
 - 2. Product Certificates: For each type of mirror and mirror mastic.
 - 3. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.
 - 4. Sample Warranty: For special warranty.
- C. Closeout Submittals:
 - 1. Maintenance Data: For mirrors to include in maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

1.4 PRECONSTRUCTION TESTING

- A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.
 - 1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Avalon Glass and Mirror Company.
- B. Binswanger Mirror; a division of Vitro America, Inc.
- C. Gardner Glass, Inc.
- D. Guardian Industries Corp.; SunGuard.
- E. Independent Mirror Industries, Inc.
- F. National Glass Industries.
- G. Virginia Mirror Company, Inc.
- H. Walker Glass Co., Ltd.
- I. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- J. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

- A. Mirrors, General: ASTM C 1503; manufactured using copper-free, low-lead mirror coating process.
- B. Safety Glazing Products: For laminated mirrors, provide products that comply with 16 CFR 1201, Category II.

2.3 MISCELLANEOUS MATERIALS

- A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

2.4 MIRROR HARDWARE

- A. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- B. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.5 FABRICATION

- A. Fabricate mirrors in the shop to greatest extent possible.
- B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
- C. Mirror Edge Treatment: Flat polished, Steel frame.
 - 1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 - 2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.

- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
- B. Provide a minimum airspace of 1/8 inch (3 mm) between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

3.4 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer.

END OF SECTION

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-structural metal framing, including the following:
 - 1. Non-load bearing interior light gauge steel studs and furring.
 - 2. Backing plates not provided by other trades for support of items attached to metal framing system.
 - 3. Supplementary parts and components, such as clips, fasteners, supplementary framing, and other miscellaneous accessories required for a complete installation.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 53 - Miscellaneous Carpentry.
- B. Section 09 29 00 - Gypsum Board.

1.3 DEFINITIONS

- A. CASRN: Chemical Abstract Service Registration Number.
- B. CSR: corporate sustainability report.
- C. EPDs: Environmental Product Declarations.

1.4 DELEGATED DESIGN PERFORMANCE REQUIREMENTS

- A. Design, engineer, fabricate, assemble and install non-structural metal framing work in compliance with specified standards, performance requirements, material selections and requirements of this and related sections; to satisfy applicable governing codes and regulations; and to provide structurally sound assemblies.
 - 1. Where non-structural metal framing work shown in the Drawings complies with manufacturer's published structural performance (span charts) or standard details, these manufacturer standard documents shall be considered an acceptable substitute for the engineering analysis, calculations and shop drawings described below.
- B. Drawings of non-structural metal framing assemblies are diagrammatic and show design intent of finished profiles, shapes, and forms; relationships between elements; location, identification, dimension and size of components, assemblies, and accessories; and details and diagrams of connections.

- C. Include engineering analysis by a qualified Engineer, using structural performance requirements and design criteria indicated herein.
- D. Determine the size, thickness, and spacing, when not shown on the Drawings, of members, their connections to one another, and anchors to building structure using the following criteria:
 - 1. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure.
 - 2. Performance Requirements: Unless otherwise indicated on the Drawings, engineer assemblies to withstand the loads prescribed by the authorities having jurisdiction, within the specified deflection limits.
 - a. Lateral loading:
 - 1) 5 psf for interior partitions; as prescribed for exterior walls.
 - 2) 10 psf at elevator shafts, pressurized areas, loading dock areas and where identified in the Drawings; as prescribed for exterior walls.
 - b. Limit metal framing systems deflection under load to the following:
 - 1) L/240 where supporting gypsum board only.
 - 2) L/360 where supporting tile.
 - 3. Sound Transmission Characteristics: Provide materials and construction as indicated in the assembly, tested in accordance with ASTM E 90 and classified according to ASTM E413 by a qualified independent testing agency.
 - a. Provide assemblies designed and pretested to achieve the minimum ratings as indicated on the Drawings.
- E. If required by authorities having jurisdiction, prepare and submit to authorities having jurisdiction: reviewed shop drawings, specifications, load and deflection tables and any other supporting data required by authorities having jurisdiction for their review and approval; and pay fees incurred, prior to beginning installation.

1.5 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: Include a list of proposed products and materials to be provided for complete assemblies, along with manufacturer's product data, specifications, typical installation details and other data for each material listed to prove compliance with the specified requirements.
 - 2. Shop Drawings: large scale, dimensioned shop drawings for Contractor-engineered assemblies.
 - a. Show framing member size, thicknesses, number, type, location, and spacing.
 - b. Indicate component details, framing layout, framed openings, anchorage to structure, bracing, type and location of fasteners and welds, and accessories required for related work.
 - c. Show metal thicknesses, spacing of members and span dimensions.
- B. Informational Submittals:

1. Manufacturer's Design Data: Submit complete load and deflection tables properly annotated for the indicated framing sizes, spacing, span limits and thicknesses to be used.
2. Certificates:
 - a. Mill certificates and galvanizing certificates: Signed by framing member/accessory manufacturer certifying compliance with material requirements.
 - b. Welder certificates: Submit certificates verifying welders to be employed in this work have satisfactorily passed AWS qualification tests. If re-certification of welders is required, retesting will be Contractor's responsibility.
3. Manufacturer's Installation Instructions: Submit manufacturer-prepared instructions concerning the proper preparation and installation framing members and framing accessories.

1.6 QUALITY ASSURANCE

- A. Installer's Qualifications: Firm and individuals with a minimum of 3 consecutive years experience in the installation of specified products on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance.
- B. Qualifications for Welding Work: Use qualified welders experienced in welding lightgauge steel and comply with AWS D1.1/D1.1M and AWS D1.3/D1.3M.
- C. Regulatory Requirements: Where fire-resistive construction is indicated, provide materials, accessories, and application procedures listed by UL, or tested according to ASTM E119 for the type of construction shown, and approved by the authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Protect materials from excessive moisture in shipment, storage, and handling.
- B. Storage: Store off ground, either in a dry, ventilated, enclosed space or protected with suitable waterproof coverings.
- C. Handling: Protect metal framing units from rusting and damage.

1.8 SEQUENCING

- A. Coordinate placement of concealed internal wall reinforcement, such as backing plates, for items to be attached to metal support systems.
- B. Coordinate installation of ceiling and soffit suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorage to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.
- C. Furnish concrete inserts, and other devices indicated, to other trades for installation well in advance of time needed for coordination with other construction.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Provide metal framing members from one of the following:
 - 1. MarinoWARE.
 - 2. SCAFCO Corporation.
 - 3. Clarkwestern Dietrich Building Systems LLC.
 - 4. Telling Industries.
 - 5. MBA Metal Framing.

2.2 STUDS, RUNNERS, AND FURRING

- A. Framing Members - General: Comply with ASTM C754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A653/A653M, G40.
- B. Smooth Steel Studs: ASTM C645, punched web complying with the following:
 - 1. Protective coating: ASTM A653/A653M, G40 galvanized coating.
 - 2. Bracing: Where the wall finish does not adequately brace both flanges of studs, provide bracing or reduce allowable stresses for computing stud heights in compliance with requirements of the authorities having jurisdiction.
 - 3. Uncoated Metal Thickness: Minimum 0.018-inch, refer to the Drawings.
- C. Dimpled Steel Studs and Runners:
 - 1. Protective coating: ASTM A653/A653M, G40 galvanized coating.
 - 2. Bracing: Where the wall finish does not adequately brace both flanges of studs, provide bracing or reduce allowable stresses for computing stud heights in compliance with requirements of the authorities having jurisdiction.
 - 3. Uncoated Metal Thickness: Minimum 0.015-inch.
- D. Top and Bottom Tracks: As recommended by the manufacturer of each stud type and of the same thicknesses as the studs in same wall or partition, unless otherwise indicated on the Drawings. Provide unpunched, screwable tracks with 1-1/4-inch flanges.
- E. Slip-Type Head Joints: Where indicated, provide one of the following:
 - 1. Single Long-Leg Runner System: ASTM C645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12-inches of the top of studs to provide lateral bracing.
 - 2. Double-Runner System: ASTM C645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 - 3. Slip-Type Head Joints: To accommodate slab deflection where studs extend to the underside of beams, floor or roof slabs, secure at top with a deep leg, minimum 0.063-inch slip connection.

- F. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs by one of the following:
 1. "The System" by Metal Lite, Inc.
 2. "MaxTrack (SLT)" by Clark Dietrich, Inc.
 3. "Slotted Track", SCAFCO Steel Stud Company.
 4. Or other Code-compliant assemblies acceptable to the Architect.

G. Furring Channels: Minimum 0.018 inch thick, galvanized, hat-shaped.

H. Horizontal stiffener, runner channels and bridging: Complying with ASTM A1003/A1003M, minimum 0.053-inch metal thick, channels fabricated of cold-rolled steel with flanges not less than 7/16-inch wide. Minimum weights as follows:

Channel Size	Flange Width	Pounds/1000 linear foot
3/4-inch	7/16-inch	300
1-1/2-inch	7/16-inch	475
2-inch	19/32-inch	590

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, minimum 0.062 inch diameter wire, or double strand of minimum 0.048-inch diameter wire.

- B. Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper:
 1. Hanger Wire: Minimum 0.12 inch diameter, unless otherwise indicated.
 2. Diagonal Bracing Wire: 0.08 inch diameter, unless otherwise indicated.
 3. Tie wire: 0.05 inch diameter, single-strand annealed steel or 0.04 inch diameter, galvanized, double-strand annealed steel.

C. Flat Hangers: Steel sheet, minimum 1 by 3/16 inch by length as required by conditions of the installation.

D. Metal Channels Supporting Suspended Ceilings (Carrying Channels): Provide metal channels complying with ASTM C 641, galvanized in compliance with ASTM A 924, G60 coating designation, for framing, furring and stiffening, as follows:

Size	Type	Pounds per 1,000 linear feet
3/4 inch	Cold-rolled	300
1 inch	Hot-rolled	410
1-1/2 inches	Hot-rolled	475
2 inches	Cold-rolled	590

- E. Furring Channels (Furring Members):
 1. Cold-Rolled Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2 inch wide flanges, 3/4-inch deep.
 2. Steel Studs and Runners: ASTM A645/A645M.
 - a. Minimum Base-Metal Thickness: minimum 0.033-inch.
 - b. Depth: As indicated on Drawings.
 3. Hat-Shaped, Rigid Furring Channels: ASTM A645/A645M, 7/8-inch deep.
 - a. Minimum Base-Metal Thickness: Minimum 0.033 inch thickness.

4. Resilient Furring Channels: 1/2-inch deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical.
- F. Direct Hung Suspension System (Alternate Method):
 1. Cross Tees: 1-1/2-inch high double web .020-inch thick electro-galvanized steel with 15/16-inch wide capped flange face.
 2. Wall Track: 1-1/2-inch to 1-5/8-inch inside dimensions .020-inch thick electro-galvanized steel with 15/16-inch to 1-inch wide top and bottom flange faces.
 3. Acceptable Products:
 - a. "Drywall Suspension System" (USG Corp.).
 - b. "System 640" (Rockwool International).
 - c. "Drywall Grid System" (Armstrong World Industries, Inc.).
- G. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E1190 by an independent testing agency.

2.4 FASTENERS AND ACCESSORIES

- A. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates; length and thickness required by Code, or recommended by the metal framing manufacturer when not prescribed by Code.
- B. Shot pins: 0.140-inch diameter low velocity powder-actuated drive pins equivalent to Ramset/Red Head No. 1508, or other as approved by Architect, with 7/8-inch minimum penetration into concrete.
- C. Anchor bolts: ASTM A307, non-headed type.
- D. Expansion shields: FS FF-S-325, except do not use lead, fiber and plastic shields.
- E. Welding electrodes: ASTM A 233, as recommended by AWS for the conditions of use and the metals to be welded.
- F. For low walls: stud reinforcement "Floor Anchor" (Pinquist Tool & Die Co., Inc.), at every stud.
- G. Isolation Strip at Exterior Walls - 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.
- H. Extruded Aluminum Partition Closures: Pre-assembled and spring loaded to provide a tight fit for vertical junctures of partitions and window walls. Finished to match mullions in a spray applied water-borne cross-linked baked acrylic finish or Acrylic-Polyester hybrid powder coat paint finish. Sound tested to a composite STC of 38 with acoustical batts for sound attenuation. Basis of Design: Mullion Mate 3 (Series 40 Plus.)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine adjacent construction and supports.
- B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

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.
- B. Coordination with Sprayed Fire-Resistive Materials:
 - 1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
 - 2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
 - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C841 that apply to framing installation.
 - 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C1063 that apply to framing installation.
 - 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C844 that apply to framing installation.
 - 4. 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 WALL INSTALLATION

A. General:

1. Erect metal framing systems in compliance with their manufacturer's recommendations, the referenced standards, the Drawings and these Specifications.
2. Use minimum 0.039-inch thick studs at the following locations:
 - a. Each side of door openings.
 - b. Where studs support backing plates, plumbing fixtures and wall-supported cabinets.
3. Do not attach metal framing to ducts, conduits or pipes. Do not allow metal framing and suspension wires to contact pipes.
4. Cut framing components squarely for a tight fit against abutting members. Erect framing plumb and level to provide solid backing for finish materials. Install steel studs in a wall/partition so that their flanges point in the same direction.
5. Do not exceed a 1/8-inch in 10-foot deviation (non-cumulative) from true lines and levels, nor 1/4-inch from true position. Perform necessary remedial work on framing to achieve specified tolerances.

B. Wall/Partition Framing:

1. Layout partitions and permanently mark on slabs.
2. Align and securely anchor ceiling and floor tracks to building construction. Space anchors within 6-inches of ends of each track segment and at 24-inches o.c. maximum. Do not drive fasteners closer than 2-inches to slab or curb edge.
3. 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.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
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. Frame openings in stud walls. Provide double studs, closer spacing, and additional reinforcement as detailed or required at doorframes, interior windows and recesses for equipment.
7. Frame both sides of control joints in gypsum board surfaces with separate studs and a discontinuous runner; do not bridge the joint with system components or accessories.
8. Assemble corners using a minimum of 3 studs.
9. Install studs in single length, without joints, extending from floor to underside of floor or roof structure above, except where indicated on the Drawings to stop at or above suspended ceilings. Splicing studs is not permitted without the Architect's approval.
10. Where studs stop at or above suspended ceilings, unless otherwise indicated, brace every fourth stud (maximum) with opposite stud bracing at 45 deg angles securely anchored to the floor or roof above.

11. Attaching studs to runner: Attach studs to tracks by friction fit for single stud gypsum board partitions.
 12. Attach the following studs to runner tracks with screws or with a crimping tool in compliance with the stud manufacturer's instructions, except where indicated to be welded.
 - a. Studs with gypsum board on only one side.
 - b. Studs on each side of doors.
 - c. Studs supporting wall hung plumbing fixtures.
 - d. Studs supporting wall hung urinal screens, toilet compartments, cabinets and equipment.
 - e. Attach corner studs, partition intersections, studs on each side of doorjamb, and other openings in walls/partitions as specified above.
 13. Unless otherwise indicated, provide horizontal stiffeners consisting of 3/4-inch channels spaced at not more than 54-inches o.c. maximum in partitions/walls supporting wall supported cabinets. Attach stiffeners to each stud.
 - a. Provide an additional 3/4-inch channel 6-inches above door head and extend 2 stud spaces beyond jamb studs.
 - b. Install channels in longest possible lengths, lap 12-inches and wire-tie at joints. Do not tie channels on opposite sides of staggered and double stud partitions together.
 14. Double studs (face to face to form a tube) at locations adjacent to doors and openings. Extend studs at door openings to slab or deck above and anchor securely to bottom track (as specified in subparagraph 12.b. above) and to top slab or deck with clip angles.
 - a. Locate additional studs not more than 2-inches from door and window frames, abutting partitions, partition corners, and other construction.
 - b. Install a section of track over door and window frames with a clip angle at each end and attach securely to the adjacent vertical studs.
 - c. Install cut-to-length studs at the location of vertical joints and at standard spacing over the doorframe header extending to the ceiling track.
 15. Install studs 2-inches away from abutting concrete, steel columns or other structural elements. Extend the horizontal stiffeners and attach it to the structural element.
 16. Provide additional framing, as required, for attachment of electrical boxes, fire extinguisher cabinets and similar items located in stud walls.
- C. Furring:
1. Provide furring attached to concrete and metal framing to conceal utilities, furred soffits, and other furring as indicated.
 2. Furring to receive gypsum board shall be screw-on channels directly attached to backing material, or applied over runner channels as applicable.
 3. Furring to receive plaster shall be 3/4-inch cold-rolled channels wire tied to 1-1/2-inch runner channels.
 4. Space furring as indicated for studs.
- D. Install extra stud, furring members and angle runners at terminations of gypsum board work, and at openings and where required for support of other work occurring in the gypsum board work.

1. Install sheet metal strapping, studs, hat-shaped channels or stud runners in walls where shown on the Drawings or as required by the conditions of the installation, minimum same thickness as stud framing, for the support and attachment of other work. Attach to stud framing with not less than three screws per stud.
- E. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

3.5 INSTALLING CEILING & SOFFIT SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Do not attach wires to, or bend around, interfering material such as ductwork, pipes and conduits.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. 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.
- G. Space main runners not over 4 feet O.C. in any dimension so that hanger wires do not support more than 12 square foot of ceiling.
- H. Hang suspended framing independent of walls, columns, pipes, ducts, and conduits, and their insulation.
- I. Space runner channels not more than 6 inches from parallel walls or beams.
 - 1. Align runner channels accurately relative to indicated ceiling height and saddle-tie with hanger wires.
 - 2. Lap channels 12-inches at splices and tie at each end of lap.
- J. Attach furring channels to runner channels at right angles to carrying channels with clips or with 0.05 inch diameter tie wire with triple wrap and triple twist.
 - 1. Space at not over 12-inches O.C. for lath/plaster assemblies, and 16 inches O.C. for gypsum board.
 - 2. Locate approximately 2-inches from parallel walls.
 - 3. Lap channels 12-inches at splices and wire-tie at each end of lap.
 - 4. Assemble and install metal grillage so that it is rigid, square, and free of movement, and level within the tolerances specified.
 - 5. At control joints, provide discontinuous lap in main runners occurring over joints.
 - a. Do not bridge joints with cross furring where joints run perpendicular to furring.
 - b. Where joints run parallel to furring, provide furring to support each side of joint.
- K. Provide recesses and openings where indicated for lighting fixtures, registers, access panels and other items to be installed in ceilings. Provide additional furring channels where required by opening condition.
- L. Installation Tolerances: Install suspension systems that are level to within 1/8-inch in 12-foot measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.6 INSTALLATION OF DIRECT HUNG CEILING SYSTEM (ALTERNATE METHOD)

- A. Install direct hung ceiling (interior) system in accordance with the manufacturer's printed instructions and as specified herein. Comply with ANSI A97.2 and as further specified. Furnish and install hanger devices in coordination with other work.
- B. Interconnect main furring runners with furring tees at 24-inches o.c. Install furring tees on all sides around recessed lighting fixtures and other openings in ceiling.

- C. Install additional hangers around light fixtures as required to support additional weights of light fixtures. Verify weights of light fixtures prior to installation of suspension system and hangers. Wrap hanger wires tightly at least three full turns.

3.7 WELDING

- A. Perform welding in compliance with AWS recommendations with welders qualified to weld lightgauge metal. Provide stitch plates where studs are burned-through.
- B. Backing Plates:
 - 1. Backing plates may be omitted if anchorage for wall-hung items is directly into steel studs of 0.053-inch (1.34 mm) thick or heavier, or items are furnished with equal mounting devices.
 - 2. Wall-mounted and wall-hung items that require backing plates include, without limitation, the following:
 - a. Grab bars.
 - b. Toilet compartments and screens.
 - c. Toilet room accessories.
 - d. Wall and base cabinets.
 - e. Plumbing fixtures.
 - f. Ladders.
 - g. Wall mounted door stops.
 - 3. Unless otherwise indicated, plates not provided with fixtures and equipment shall be long enough to span, as a minimum, across 3 studs and may be one of the following:
 - a. 0.053-inch (1.34 mm) thick minimum steel plate by 4 inches wide.
 - b. 3-5/8-inch (92 mm) unpunched wide flange steel stud of 0.053-inch (1.34 mm) thickness. Notch studs so that backing plate will be flush with exterior face of stud.
 - c. Optional Backing Clip System:
 - 1) Material: ASTM A653/A653M cold formed steel.
 - 2) Coating: G60 hot-dipped galvanized.
 - 3) Thickness: Minimum of 0.033 inches (0.84 mm).
 - 4) Acceptable Products:
 - (a) ClarkDietrich Danback Flexible Wood Backing.
 - (b) Mantisgrip Backing Clips.
 - 4. Weld plates continuously along contact surfaces at each stud crossing, or secure with 2 countersunk machine screws at each stud.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior gypsum board.
- B. Tile backer board

1.2 RELATED REQUIREMENTS

- A. Section 09 22 16 - Non-Structural Metal Framing for non-structural steel framing and suspension systems that support gypsum board panels.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: Submit manufacturer's technical data for each type of gypsum board product, including related accessories. Furnish a material list with technical data documenting the location and primary function, quality, and performance of each material component or system to be used in the Work, or other such primary characteristics as required by the Drawings or Specifications.
 - a. Submit manufacturer's technical data for each gypsum drywall partition and each ceiling system.
 - 2. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 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.

1.6 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 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.

2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers:
 - 1. American Gypsum.
 - 2. CertainTeed Corporation.
 - 3. Georgia-Pacific Building Products.
 - 4. National Gypsum Company.
 - 5. USG (EcoSmart gypsum board products are acceptable).
- B. Gypsum Board, Type X: ASTM C1396/C1396M.
 - 1. Thickness: 5/8 inch (15.9 mm).
 - 2. Long Edges: Tapered.
- C. Flexible Gypsum Board: ASTM C1396/C1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
 - 1. Thickness: 1/4 inch (6.4 mm).
 - 2. Long Edges: Tapered.
- D. Gypsum Ceiling Board: ASTM C1396/C1396M.
 - 1. Thickness: 1/2 inch (12.7 mm).
 - 2. Long Edges: Tapered.

2.4 TILE BACKER BOARD

- A. Provide at tiled walls indicated on the Drawings. Unless noted on the Drawings, or specified otherwise, provide one of the following at the Contractor's option:
1. Cementitious Board: Fiberglass mesh reinforced portland cement aggregate water resistant mixture formed boards, 1/2 inch thick, complying with ASTM C 1325 and ANSI A118.9, one of the following:
 - a. "Durock" (USG, Chicago, IL 60680).
 - b. "Wonder-Board" (Custom Building Products, Seal Beach, CA 90740).
 - c. "Util-A-Crete" (Fin Pan, Inc., Hamilton, OH 45012).
 - d. "Perma Base" (National Gypsum).
 2. Glass Mat Faced Water Resistant Gypsum Tile Backer Board Complying with ASTM C 1178 and ASTM D 3273, regular, 1/2 inch thick, (Type X, 5/8 inch thick where required to be fire-rated, provide one of the following:
 - a. "Dens-Shield Tile Backer" (Georgia-Pacific).
 - b. "GlasRoc DiamondBack Tile Backer" (Certainteed).
 - c. "e²XP® Tile Backer" (National Gypsum).

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Manufacturers:
 - a. Fry Reglet Corporation.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 2. Profile: As indicated on Drawings.
 3. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5.
 4. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
1. Interior Gypsum Board: Paper.

- 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 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 setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

2.5 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.
 - 1. Verify adhesives have a VOC content of 50 g/L or less.
- 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 (0.84 to 2.84 mm) thick.
- D. Electrical Box Pads: Putty Pads: Moldable non-curing one component, intumescent, fire-rated material for through-penetration fire stop systems and sound attenuation systems; self-adhering; 1/8-inch-thick minimum.
 - 1. Acceptable Products:
 - a. CP 617 as manufactured by Hilti Incorporated.
 - b. Lowry Pads as distributed by Lowry's Specialty Distribution.
 - c. Firestop Putty as manufactured by Specified Technologies, Inc. (STI)
 - d. 3M Fire Barrier as manufactured by 3M Fire Protection Products.

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 (1.5 mm) 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. (0.7 sq. m) 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- (6.4- to 9.5-mm-) 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- (6.4- to 12.7-mm-) 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.

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. Flexible Type: Apply in double layer at curved assemblies where indicated on drawings.
 - 3. Ceiling Type: Ceiling surfaces, except at fire rated ceilings, then use Type X.
- 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 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.
 2. 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.
 3. 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 GYPSUM PANELS FOR CEILINGS

- A. Apply panels perpendicular to supports, with end joints staggered and located over supports.
1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
 2. Fasten with corrosion-resistant screws.

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 according to ASTM C840 and in specific locations approved by Architect for visual effect, unless otherwise indicated.
- C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. Bullnose Bead: Use at outside corners.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where indicated.

5. U-Bead: Use at exposed panel edges.
 6. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING 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 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 according to ASTM C840:
1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile.
 3. Level 3: Mechanical Rooms, Electrical Rooms, and similar spaces.
 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 - Interior Painting.
 5. Level 5:
 - a. Where indicated on Drawings.
 - b. Primer and its application to surfaces are specified in Section 09 91 23 - Interior Painting.

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

**SECTION 09 30 00
TILING**

PART 1 - GENERAL

1.1 SUMMARY

- A. Tile on floors, walls, and wall base including, mortar grout, adhesives, underlayment, anti-fracture membrane and installation accessories and materials.
- B. Related Sections:
 - 1. Tile Backer Board: Section 09 29 00

1.2 SUBMITTALS

- A. Manufacturer`s Literature: Materials description and recommended installation instructions for manufactured mortar, grout, latex additive, grout sealer, anti-fracture membrane.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces. Include details of movement joints.
- C. Samples:
 - 1. Samples one (1) of each type and finish of tile through range of color, with grouted joints.
 - 2. Sample of each tile trim shape.
 - 3. Samples of colored grout through full range of colors.
 - 4. 6 inch long samples of transition strips.
- D. Certification: Copies of waterproofing membrane manufacturer's certification that the anti-fracture and/or waterproofing membrane materials are compatible with the setting materials to be used in the installation

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer with not less than five (5) consecutive years experience and who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.

- C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, and grout component from a single manufacturer and each aggregate from one source or producer.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Accept delivery of material only in an undamaged condition; store above ground and in a dry place within the building. Maintain packaged material in original containers with seals unbroken and labels intact until time of use. Provide wrapped or bundled material bearing the name of the manufacturer and the product. Immediately remove from the job site all damaged or otherwise unsuitable material, when so ascertained.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Tile Setting Materials:
 - 1. Latricrete International, Inc.
 - 2. Mapei Corporation.
 - 3. Hydroment, Bostik Findley, Inc.

2.2 MATERIALS

- A. Floor & Wall Tile, TL-1, TL-2, TL-3, and TL-4: Tile types, sizes, colors, patterns, products and manufacturers are indicated on the Drawings. Furnish trim shapes as required by conditions; angles, corners, bullnose, and other shapes required by installation conditions.
- B. Transition Strips: Extruded aluminum or galvanized steel "L" strips with zinc alloy exposed top edge, 1/4 inch height x 1-1/2 inches long x 1/8 inch thick, as manufactured by one of the following:
 - 1. Terrazzo Marble & Supply.
 - 2. Tesco Products, Inc.
 - 3. Schluter-Systems L.P.
- C. Perimeter Isolation: Flexible polyethylene foam perimeter isolation material used for isolating underlayment and finish floor at perimeter walls, provide one of the following:
 - 1. Quiet Qurl Perimeter Isolation, Keene Building Products.
 - 2. Enkasonic Perimeter ISO, as manufactured by Colbond, Inc.
- D. Latex-Portland Cement Mortar for Thin-Set of Floor and Wall Tile: ANSI A118.4; prepackaged dry-mortar mix combined with water additive. Provide one of the following:

1. Laticrete Sure Set, Laticrete
 2. Ultraflex LFT, Mapei
 3. StoneWall, Bostik Hydroment
- E. Floor and Wall Grout (Colored): ANSI A118.6; un-sanded, for joints less than 1/8 inch wide.
1. 1600 Series Unsanded Grout, Laticrete
 2. Keracolor U, Mapei
 3. Dry Tile Grout, Unsanded, Bostik Hydroment
- F. Floor and Wall Grout (Colored): ANSI A118.6; sanded for joints 1/8 inch wide and greater.
1. 1500 Series, Sanded, Laticrete
 2. Keracolor S, or Ultracolor Plus Mapei
 3. Ceramic Tile Grout, Sanded, Bostik Hydroment
- G. Latex Liquid Additive:
1. Laticrete No. 4237 for mortar and No. 1776 for grout, Laticrete
 2. Keralastic for mortar, Mapei
 3. 425 Multi-Purpose Acrylic Latex Admixture, Bostik Hydroment
- H. Anti-Fracture Membrane (For thin-set floor tile): ANSI A118.12; factory prepackaged one part liquid rubber or two-part synthetic polymer and powder for trowel application with glass fiber fabric reinforcing compatible with setting materials:
1. Blue 92, Laticrete
 2. Mapelastc HPG, Mapei.
 3. Ultra-Set, Bostik Hydroment
- I. Grout Joint Sealer: Clear penetrating siliconized product compatible with the grout and tile materials used and approved by the grout and tile manufacturer. Provide sealer which is non-yellowing and will not change the appearance in texture or coloring of the grout and tile after application.

2.3 PROPORTIONING MORTAR AND GROUT

- A. General:
1. When factory premixed grout is used in the installation with latex liquid additives, provide both products produced by the same manufacturer to ensure compatibility.
 2. When factory premixed dry-set mortar is used in the installation with latex liquid additives, provide both products produced by the same manufacturer to ensure compatibility.
 3. Anti-Fracture Membrane: When used in the installation, provide a product produced by the same manufacturer as mortar to ensure compatibility.
 4. The grout and mortar used in the installation may be from different manufacturers.

5. Mix mortar and grout in accordance with the manufacturer's printed instructions.
- B. Floor and Wall Thin-Set Mortar: Factory premix with water or latex additive added in accordance with the manufacturer's recommendations.

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 installed tile.
- B. 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. If present remove in accordance with the tile setting bed material manufacturer's requirements.
1. Comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 2. Verify that concrete substrates for tile floors installed with adhesives, bonded mortar bed and/or thin-set 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.
- C. Alkalinity and Adhesion Testing: Perform tests recommended by setting materials manufacturer. Proceed with installation only after substrates pass testing.
- D. Test for Moisture: Perform the test as required by the flooring material manufacturer to determine the manufacturer's acceptable floor slab moisture before installation.
1. Test floor slab for relative humidity by ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. Proceed with installation only after substrates have maximum level humidity in the floor slab recommended by the setting bed material and tile manufacturers. Proceed with installation only after substrates pass testing.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Examine all surfaces to receive the parts of the Work specified herein. Verify all dimensions of in-place and subsequent construction. Verify that water resistant gypsum wallboard and tile backer board is installed and prepared in accordance with Gypsum Association GA 216-75. Application of materials constitutes acceptance of the substrate.
- B. Do not start work until grounds, anchors, plugs, hangers, bucks, etc. have been installed and until adjoining work is satisfactorily protected.
- C. Keep containers in which tile and other materials are packed dry until tiles and other materials are removed and every precaution taken to see that tiles are not stained before they are set in place. Maintain temperatures in rooms where tile is being set at a minimum of 40 degrees F.
- D. Clean, mechanically etch or scabble concrete and wall surfaces as required by conditions of the installation to maximize bond.
- E. Layout tile in each area as shown on the Drawings in such a manner as to minimize the cutting of tile.

3.3 TILE INSTALLATION – GENERAL

- A. 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.
- B. 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.
- C. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- D. 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 the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. 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.
 - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 3. 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.

- E. Joint Widths: Unless otherwise indicated, install tile with 1/8 inch wide joints.
- F. Movement Joints:
 - 1. Construct movement (expansion & control) joints by installing wood strips extending through setting bed.
 - 2. Provide width of such joints as shown on the Drawings, but not less than 1/8 inch for ceramic mosaic and glazed tile and not less than 1/4 inch for quarry tile.
 - 3. If locations of such joints are not shown, install at restraining surfaces, such as walls, curbs, columns, pipes, over expansion joints in backing, at changes in backing material in accordance with TCNA Handbook EJ-171.
 - 4. In large interior tiled areas provide movement joints not more than 20 to 25 feet o.c. each way for slabs on grade and 8 to 12 feet o.c. for elevated slabs.
 - 5. After tile has set for three days, remove the wood strips, clean and repair the joints.
 - 6. Sealing of joints is included in Section 07 92 00.

3.4 INSTALLATION OF FLOOR TILE

- A. Dry-Set (Thin-Set) Mortar, TCNA Method F125A: For tile installed over anti-fracture membrane:
 - 1. Anti-Fracture Membrane: Install anti-fracture membrane and reinforcement fabric on cured above grade concrete slabs in accordance with the manufacturer's printed installation instructions. Allow the membrane to cure before proceeding with tile installation.

3.5 INSTALLATION OF WALL TILE

- A. Metal Studs with Gypsum Board, TCNA Method W243.

3.6 GROUTING

- A. After tile is firmly set, fill joints with grout.

3.7 CLEANING AND SEALING

- A. Upon completion of tile work in each area, including work specified under other Sections, clean all tile surfaces with warm water and a high quality washing compound. Do not use acid or acid cleaners. Sponge and wash tile thoroughly, working diagonally across joints; polish with dry cloths.
- B. Immediately prior to occupancy by the Owner, wash tile surfaces, again, and perform additional grouting that may be necessary.
- C. After cleaning of tile and grout apply clear sealer to all grout joints. Wipe tiles clean of sealer residue.

3.8 PROTECTION

- A. Cover tile floors with non-staining building paper or polyethylene sheeting until just prior to occupancy by the Owner. During construction protect tiled areas used as walkways with plywood boards in addition to other covering specified.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Acoustical panels and exposed suspension systems for interior ceilings.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 SUBMITTALS

- A. Action Submittals:

- 1. Product Data: For each type of product.

- B. Informational Submittals:

- 1. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

- a. Ceiling suspension-system members.
 - b. Structural members to which suspension systems will be attached.
 - c. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - d. Size and location of initial access modules for acoustical panels.
 - e. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - 1) Lighting fixtures.
 - 2) Diffusers.
 - 3) Grilles.
 - 4) Speakers.
 - 5) Sprinklers.
 - 6) Access panels.
 - 7) Perimeter moldings.
 - f. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
 - g. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

- 2. Qualification Data: For testing agency.

- 3. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

- 4. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

5. Field quality-control reports.

C. Closeout Submittals:

1. Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

B. Build mockup of typical ceiling area as shown on Drawings.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: 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 according to ASTM E1264.
2. Smoke-Developed Index: 50 or less.

- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 ACOUSTICAL PANELS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation; Saint-Gobain North America.
 - 3. Rockfon (Rockwool International).
 - 4. USG Corporation.
- B. Basis of Design Products: Subject to compliance with requirements of specifications, provide the products indicated for each designation in the Interior Finish Legend.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers:
 - 1. Armstrong Ceiling & Wall Solutions.
 - 2. CertainTeed Corporation; Saint-Gobain North America.
 - 3. Rockfon (Rockwool International).
 - 4. USG Corporation.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.
- C. Standard Exposed Tee Ceiling Systems:
 - 1. Wide-Face (15/16-inch), Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges. Provide fire-resistance rated system where required.
 - a. Structural Classification: Intermediate-duty system[, or greater as otherwise required to comply with seismic regulations].
 - b. End Condition of Cross Runners: Override (stepped) or butt-edge type.
 - c. Face Design: Flat, flush.
 - d. Cap Material: Cold-rolled steel.
 - e. Cap Finish: Painted white, unless otherwise noted in Interior Finish Legend on Drawings.
 - 2. Narrow-Face (9/16-inch), Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 9/16-inch- (15-mm-) wide metal caps on flanges.
 - a. Structural Classification: Intermediate-duty system[, or greater as otherwise required to comply with seismic regulations].
 - b. End Condition of Cross Runners: Override (stepped) or butt-edge type.

- c. Face Design: Flat, flush.
- d. Cap Material: Cold-rolled steel.
- e. Cap Finish: Painted white, unless otherwise noted in Interior Finish Legend on Drawings.
- f. Reveal Finish: Match face finish.

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 according to ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Cast-in-place anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.
 - 2. Corrosion Protection: Stainless-steel components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316.
 - 3. 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 hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.
- 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 0.106-inch- (2.69-mm-) diameter wire.

2.6 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation; Saint-Gobain North America.
 - 3. Fry Reglet Corporation.
 - 4. Gordon, Inc.
 - 5. Rockfon (Rockwool International).
 - 6. USG Corporation.

- B. 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 shall 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.
- C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
 - 1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C635/C635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.7 SPECIAL METAL EDGE MOLDINGS AND TRIM

- A. Custom Perimeter Trim: Commercial quality extruded aluminum alloy 6063 trim channel with tee-bar connection clips or hanging clips and galvanized steel finish splice plates.
 - 1. Commercial quality extruded aluminum alloy 6063 Trim Channel and Bottom Drywall Trim, factory finished in custom paint finish color-matched to approved sample.
 - 2. Commercial quality aluminum T-Bar Connection Clip and Hanging Clip with Galvanized steel Splice Plate.
 - 3. Aluminum extrusions formed with distinct architectural detail groove on top and bottom flanges and special bosses to receive the T-bar Connection Clip, Hanging Clip and Splice Plate, to provide positive mechanical lock with no visible fasteners.
- B. Factory or field cut, mitered and curved to match drawing requirements.
 - 1. Acceptable Product: Axiom Custom Perimeter Trim, as manufactured by Armstrong World Industries, Inc.
 - 2. Face Width: _____ inches.
 - 3. Field cut or factory miter corner applications.
 - 4. Finish: Factory applied baked polyester paint.
 - a. Color: Painted white unless noted otherwise in Interior Finish Legend.

2.8 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 07 92 13 - Acoustical Joint Sealants.

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

- A. Install acoustical panel ceilings according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
 - 1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- 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.
- C. 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.
 - 1. 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.

2. 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.
 3. 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.
 4. Do not attach hangers to steel deck tabs.
 5. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 6. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 7. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- D. 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.
- E. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- F. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. 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. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. 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.
 5. Route tegular cut edges to match profiles.
 6. 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.

7. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

H. Where existing ceilings are present:

1. Rework existing ceiling grid as required to maintain a continuous pattern within each room. Group new and existing tiles into areas for consistency, matching color and texture.
2. Replace damaged, cracked, stained, or missing ceiling tiles throughout the areas of project as needed with tiles to match existing pattern and color.
3. Reseat insulation above existing ceiling tile where disturbed. Leave insulation in continuous plane, tightly butted throughout. Do not cover light fixtures.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), 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 (3 mm in 3.6 m), 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

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient wall base.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.
- B. Informational Submittals:
 - 1. Test Reports: Pre-installation substrate moisture and alkalinity tests.
- C. Closeout Submittals:
 - 1. Record Documents: Showing locations of substrate moisture and alkalinity tests. Provide markups on floor plan indicating the location of each test and the dates tests were performed.

1.3 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 (10 deg C) or more than 90 deg F (32 deg C).

1.4 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), 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 (13 deg C) or more than 95 deg F (35 deg C).
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Verify products 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."

2.2 MANUFACTURERS

- A. Manufacturers:
 1. Armstrong World Industries, Inc.
 2. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 3. Johnsonite; A Tarkett Company.
 4. Mannington Mills, Inc.
 5. Mondo Rubber International, Inc.
 6. Musson Rubber Co.
 7. Nora Systems, Inc.
 8. R.C.A. Rubber Company (The).Roppe Corporation, USA.
 9. VPI, LLC, Floor Products Division.

2.3 RESILIENT WALL BASE

- A. Rubber Wall Base , as scheduled in Interior Finish Schedule: ASTM F 1861,
 1. Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous), Type TP (rubber, thermoplastic) Group I (solid, homogeneous).
 - a. Style and Location:
 - 1) Style A, Straight: Provide in areas with carpet.
 - 2) Style B, Cove: Provide in areas with resilient flooring.
- B. Minimum Thickness: 0.125 inch (3.2 mm) or as indicated in Interior Finish Schedule on Drawings.
- C. Height: As indicated in Interior Finish Schedule on Drawings.
- D. Lengths: Coils in manufacturer's standard length dependent on product scheduled.
- E. Inside and Outside Corners:
 1. Preformed corners on 4-inch (102 mm) high base.
 2. Job-formed mitered corners on base over 4-inches (102 mm) high.
- F. Colors: As indicated in Interior Finish Schedule on Drawings.

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 resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Verify adhesives have a VOC content of 50 g/L or less and 60 g/L or less for rubber stair treads.

PART 3 EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. 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.
- C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 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 For 4-inch (102 mm) Base: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners For Base Over 4-inches (102 mm) high.:
 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Miter and seal corners to minimize open joints.
 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - a. Miter and seal corners to minimize open joints.

3.3 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. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 09 91 23

INTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation and the application of paint systems on interior substrates.

1.2 DEFINITIONS

- A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D523 (traditional matte finish - flat).
- B. Gloss Level 2: 5 to 10 units at 60 degrees and 10 to 25 units at 85 degrees, according to ASTM D523 (a high side sheen flat -"velvet-like" finish).
- C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523 (traditional "eggshell-like" finish).
- D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523 ("satin-like" finish).
- E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523 (traditional semi-gloss).
- F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523 (traditional gloss).
- G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523 (high gloss).

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of Paint System, submit product data cut sheets, including preparation requirements and application instructions.
 - a. Formulate product data cut sheets into sets for each Paint System required.
 - 2. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - a. Step coats on Samples to show each coat required for system.
 - b. Label each Sample with Paint System designation.
 - c. Label each Sample for location and application area.
 - d. Dry samples a minimum of 7-days before submitting.
 - e. Submit Samples on the following substrates for the Architect's review of color and texture only:

- 1) Painted Wood: Provide two 12-inch-(300-mm-) square samples of each color and material on hardboard.
 - 2) Stained or Natural Wood: Provide two 4-by-8-inch (100-by-200-mm) samples of natural- or stained-wood finish on actual wood surfaces.
 - 3) Ferrous / Galvanized Metal: Provide two 4-inch-(100-mm-) square samples of flat metal and two 8-inch-(200-mm-) long samples of solid metal for each color and finish.
 - 4) Gypsum Board / Plaster: Provide two 8-inches (200-mm) square samples on rigid backing.
3. Product List: For each product indicated, include the following:
- a. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - b. VOC content.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 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 (7 deg C).
1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products in the paint schedules.
- B. Manufacturers: The following manufacturers are referred to in the paint schedules by use of name or shortened versions of their names, which are shown in parenthesis:
 - 1. Benjamin Moore (B-M).
 - 2. PPG Paints (PPG)
 - 3. Sherwin-Williams (S-W)

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are 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, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: For field applications that are inside the weatherproofing system, verify paints and coatings 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. Dry-Fog Coatings: 150 g/L.
 - 4. Primers, Sealers, and Undercoaters: 100 g/L.
 - 5. Rust-Preventive Coatings: 100 g/L.
 - 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
 - 7. Pretreatment Wash Primers: 420 g/L.
- C. Colors: Provide custom colors of the finished paint systems to match the Architect's samples.

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. Wood: 15 percent.
 - 2. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that the 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 in "MPI Manual" or "MPI Maintenance Repainting Manual" or more stringent instructions listed below 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.
- C. Clean substrates of substances that could impair the 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. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Galvanized and Galvannealed Metal Substrates: Remove soluble and insoluble contaminants and corrosion. Remove any storage stains per Section 6.2 of ASTM D6386. Chemically treat with one of the following products in accordance with manufacturer's written instructions:
 - 1. Henkel Galvaprep 5.
 - 2. Great Lakes Laboratories Clean & Etch.
- F. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 SURFACE PREPARATION OF PREVIOUSLY COATED SURFACES

- A. General:
1. Remove cracked and deteriorated sealants and caulking.
 2. Remove chalk deposits and loose, blistered, peeling, scaling, or crazed finish to bare base material or sound substrate by scraping and sanding.
 3. Wash surfaces with solution of Trisodium phosphate (TSP) to remove wax, oil, grease, and other foreign material; rinse, and allow to dry. Exercise caution that TSP solution does not soften existing coating.
 4. Abrade glossy surfaces by sanding or wiping with liquid de-glosser.
 5. Remove mildew as specified above.
 6. Test compatibility of existing coatings by applying new coating to small, inconspicuous area. If new coatings lift or blister existing coatings, provide test results and recommendations from paint manufacturer to Architect.
 7. Apply specified primer to surfaces scheduled to receive coatings.
- B. Gypsum Board:
1. Fill cracks and voids with spackling compound.
 2. Apply primer over bare surfaces and newly applied texture coatings.
- C. Metal:
1. Remove rust from surfaces to bare metal in accordance with SP3 "Power Tool Cleaning."
 2. Exercise care not to remove galvanizing.
 3. Complete preparation as specified for new work.
- D. Wood:
1. Fill cracks, crevices and nail holes with putty or wood filler.
 2. Apply primer over bare surfaces and filler material.

3.4 APPLICATION

- A. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
1. Painting includes identifying fire-rated wall assemblies with stenciled lettering above the ceiling. Provide stenciled block letters in red to identify each rated wall assembly. Refer to Section 09 29 00 - Gypsum Board.
 2. Stairs: Paint exposed surfaces including underside.
- B. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable items, equipment, furniture, etc. the same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items, equipment, furniture, etc with prime coat only.
 3. Paint both sides and edges of doors and entire exposed surface of door frames.

4. Paint the front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
 7. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material required. Confirm use of spray equipment is acceptable to building owner in occupied areas.
- C. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- D. Tint undercoats same color as topcoat but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- E. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- F. 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.
- G. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- I. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
1. Provide satin finish for final coats.

3.5 FIELD QUALITY CONTROL

- A. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
- B. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.6 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- 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.

3.7 INTERIOR PAINT SCHEDULES

- A. Steel, Factory-Primed (Sp) Substrates
 1. Paint System Sp-L6: Latex, Gloss Finish:
 - a. B-M:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Corotech Acrylic DTM Enamel Gloss V330.
 - 3) Third Coat: Same as second.
 - b. PPG:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: PPG Pitt-Tech Plus EP Gloss DTM 90-1510 Series.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Pro Industrial Acrylic Gloss, B66-600 Series.
 - 3) Third Coat: Same as second
 2. Paint System Sp-L5: Latex, Semigloss Finish:
 - a. B-M:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Corotech Acrylic DTM Enamel Semi-Gloss V331.
 - 3) Third Coat: Same as second.
 - b. PPG:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: PPG Pitt-Tech Plus EP Semi-Gloss DTM 90-1610
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Pro Industrial Acrylic Semi-Gloss, B66-650.
 - 3) Third Coat: Same as second.

3. Paint System Sp-L2: Latex, Eggshell Finish:
 - a. B-M:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Moore Ultra Spec 500 Interior Low Sheen N537.
 - 3) Third Coat: Same as second.
 - b. PPG:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: PPG Pitt-Tech Plus EP Satin DTM 90-1710 Series.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Pro Industrial Acrylic Eg-Shel, B66-660 Series.
 - 3) Third Coat: Same as second.
4. Paint System Sp-L1: Latex, Flat Finish:
 - a. B-M:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Ultra Spec 500 Interior Latex Flat N536.
 - 3) Third Coat: Same as second.
 - b. PPG:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Speedhide Zero Interior Flat, 6-5110 Series.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: ProMar 200 Zero VOC Flat, B30-2600 Series.
 - 3) Third Coat: Same as second.
5. Paint System Sp-D1: Water-Based Dry-Fall, Flat Finish:
 - a. B-M:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110
 - 3) Same as second.
 - b. PPG:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Speedhide Super Tech Dry Fall 6-725XI.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Pro Industrial Waterborne Acrylic Dry Fall Flat, B42W1181.
 - 3) Third Coat: Same as second.
6. Paint System Sp-X5: Waterborne Epoxy, Semigloss Finish:
 - a. B-M:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Corotech Mastic Coating Semi-Gloss V160.
 - 3) Third Coat: Same as second.
 - b. PPG:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.

- 2) Second Coat: Pitt-Glaze WB1 Interior High Performance Pre-Catalyzed Waterborne ZERO VOC Epoxy Semi-Gloss, 16-1510 Series.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Touch-up primer if compatible or provide barrier coat.
 - 2) Second Coat: Pre-Catalyzed Water Based Epoxy Semi-Gloss, K46-1150 Series.
 - 3) Third Coat: Same as second.
- B. Steel, Galvanized (Sg) Substrates
 1. Paint System Sg-L6: Latex, Gloss Finish:
 - a. B-M:
 - 1) First Coat: Ultra Spec HP Acrylic Metal Primer HP04
 - 2) Second Coat: Ultra Spec HP DTM Acrylic Gloss HP28
 - 3) Third Coat: Same as second
 - b. PPG:
 - 1) First Coat: Pitt-Tech Plus 4020 PF Interior/ Exterior Primer/ Finish, 4020PF Series.
 - 2) Second Coat: PPG Pitt-Tech Plus EP Gloss DTM 90-1510 Series.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series.
 - 2) Second Coat: Pro Industrial Acrylic Gloss, B66-600 Series.
 - 3) Third Coat: Same as second.
 2. Paint System Sg-L5: Latex, Semigloss Finish:
 - a. B-M:
 - 1) First Coat: Ultra Spec HP Acrylic Metal Primer HP04
 - 2) Second Coat: Ultra Spec HP DTM Acrylic Semi-Gloss HP29
 - 3) Third Coat: Same as second
 - b. PPG:
 - 1) First Coat: Pitt Tech Plus Acrylic Primer 90-912
 - 2) Second Coat: PPG Pitt-Tech Plus EP Semi-Gloss DTM 90-1610
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series.
 - 2) Second Coat: Pro Industrial Acrylic Semi-Gloss, B66-650.
 - 3) Third Coat: Same as second.
 3. Paint System Sg-L3: Latex, Eggshell Finish:
 - a. B-M:
 - 1) First Coat: Ultra Spec HP Acrylic Metal Primer HP04
 - 2) Second Coat: Ultra Spec HP DTM Acrylic Low Lustre HP25
 - 3) Third Coat: Same as second
 - b. PPG:
 - 1) First Coat: Pitt Tech Plus 4020 PF Interior/ Exterior Primer/ Finish, 4020PF Series
 - 2) Second Coat: PPG Pitt-Tech Plus EP Satin DTM 90-1710 Series.

- 3) Third Coat: Same as second.
- c. S-W:
 - 1) First Coat: Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series.
 - 2) Second Coat: Pro Industrial Acrylic Eg-Shel, B66-660 Series.
 - 3) Third Coat: Same as second.
- 4. Paint System Sg-L1: Latex, Flat Finish:
 - a. B-M:
 - 1) First Coat: Ultra Spec HP Acrylic Metal Primer HP04
 - 2) Second Coat: Ultra Spec 500 Zero VOC Interior Flat 535
 - 3) Third Coat: Same as second
 - b. PPG:
 - 1) First Coat: Pitt Tech Plus 4020 PF Interior/ Exterior Primer/ Finish, 4020PF Series.
 - 2) Second Coat: Speedhide Interior ZERO Latex Flat 6-5110.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Pro Industrial Pro-Cryl Universal Primer, B66-310.
 - 2) Second Coat: Pro Industrial Acrylic Matte, B66-670 Series.
 - 3) Third Coat: Same as second.
- 5. Paint System Sg-D1: Water-Based Dry-Fall, Flat Finish:
 - a. B-M:
 - 1) First Coat: Ultra Spec HP Acrylic Metal Primer HP04
 - 2) Second Coat: Benjamin Moore Latex Dry Fall Flat 395
 - 3) Third Coat: Same as second
 - b. PPG:
 - 1) First Coat: Pitt Tech Plus 4020 PF Interior/ Exterior Primer/ Finish, 4020PF Series
 - 2) Second Coat: Speedhide Super Tech Dry Fall 6-725XI
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series.
 - 2) Second Coat: Waterborne Acrylic Dry Fall, B42W1.
 - 3) Third Coat: Same as second.
- 6. Paint System Sg-X5: Waterborne Epoxy, Semigloss Finish:
 - a. PPG:
 - 1) First Coat: Pitt Tech Plus 4020 PF Interior/ Exterior Primer/ Finish, 4020PF Series
 - 2) Second Coat: Pitt-Glaze WB1 Interior High Performance Pre-Catalyzed Waterborne ZERO VOC Epoxy Semi-Gloss, 16-1510 Series.
 - 3) Third Coat: Same as second.
 - b. S-W:
 - 1) First Coat: Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series.
 - 2) Second Coat: Pre-Catalyzed Water Based Epoxy Semi-Gloss, K46-1150 Series.
 - 3) Third Coat: Same as second.

C. Architectural Woodwork (Ww) Substrates

1. Paint System Ww-L5: Latex, Semigloss Finish:

- a. B-M:
 - 1) First Coat: Insl-x Prime Lock Plus Primer PS-8100
 - 2) Second Coat: Ultra Spec 500 Interior Zero VOC Latex Semi-Gloss 546
 - 3) Third Coat: Same as second
- b. PPG:
 - 1) First Coat: Seal Grip Latex Primer/Finish 17-951.
 - 2) Second Coat: Speedhide Zero Interior Semi-Gloss, 6-5510 Series.
 - 3) Third Coat: Same as second.
- c. S-W:
 - 1) First Coat: Multi-Purpose Acrylic-Alkyd Interior Primer, B79W00450.
 - 2) Second Coat: ProMar 200 Zero VOC Semi-Gloss Acrylic, B31-2600 Series.
 - 3) Third Coat: Same as second.

2. Paint System Ww-V4: Stain and Varnish, Satin Finish:

- a. PPG:
 - 1) First Coat: Deft Wood Stain Interior – VARATHANE Oil Stain, RUS12780.
 - 2) Second Coat: VARATHANE Interior WaterBorne Satin, FLE20023.
 - 3) Third Coat: Same as second.
- b. S-W:
 - 1) First Coat: Minwax Performance Series Tintable Wood Stain (a) 250 VOC Formula.
 - 2) Second Coat: Minwax Water Based Oil-Modified Polyurethane.
 - 3) Third Coat: Same as second.

D. Gypsum Board (Gb) Substrates

1. Paint System Gb-L5: Latex, Semigloss Finish:

- a. B-M:
 - 1) First Coat: Ultra Spec 500 Zero VOC Interior Zero VOC Latex Primer N534
 - 2) Second Coat: Ultra Spec 500 Zero VOC Interior Semi-Gloss 546
 - 3) Third Coat: Same as second.
- b. PPG:
 - 1) First Coat: Speedhide Zero Interior Sealer, 6-4900XI.
 - 2) Second Coat: Speedhide Zero Interior Semi-Gloss, 6-5510
 - 3) Third Coat: Same as second.
- c. S-W:
 - 1) First Coat: ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
 - 2) Second Coat: ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series.
 - 3) Third Coat: Same as second.

2. Paint System Gb-L2: Latex, Eggshell Finish:

- a. B-M:

- 1) First Coat: Ultra Spec 500 Zero VOC Interior Zero VOC Latex Primer N534
 - 2) Second Coat: Ultra Spec 500 Zero VOC Latex Eggshell N538
 - 3) Third Coat: Same as second.
 - b. PPG:
 - 1) First Coat: Speedhide Zero Interior Sealer, 6-4900XI.
 - 2) Second Coat: Speedhide Zero Interior Eggshell, 6-5310 Series.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
 - 2) Second Coat: ProMar 200 Zero VOC Interior Latex Eg-Shel, B20-2600 Series.
 - 3) Third Coat: Same as second.
3. Paint System Gb-L1: Latex, Flat Finish:
- a. B-M:
 - 1) First Coat: Ultra Spec 500 Zero VOC Interior Zero VOC Latex Primer N534.
 - 2) Second Coat: Ultra Spec 500 Zero VOC Interior Latex Flat N536.
 - 3) Third Coat: Same as second.
 - b. PPG:
 - 1) First Coat: Speedhide Zero Interior Sealer, 6-4900XI.
 - 2) Second Coat: Speedhide Zero Interior Flat, 6-5110 Series.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: ProMar 200 Zero VOC Interior Latex Primer, B28W2600.
 - 2) Second Coat: ProMar 200 Zero VOC Interior Latex Flat, B30-2600 Series.
 - 3) Third Coat: Same as second.
4. Paint System Gb-X5: Waterborne Epoxy System, Semigloss Finish:
- a. B-M:
 - 1) First Coat: Ultra Spec 500 Interior Zero VOC Latex Primer N534
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341
 - 3) Third Coat: Same as second.
 - b. PPG:
 - 1) First Coat: Speedhide Zero Interior Sealer, 6-4900XI.
 - 2) Second Coat: Pitt-Glaze WB1 Interior High Performance Pre-Catalyzed Waterborne ZERO VOC Epoxy Semi-Gloss, 16-1510 Series.
 - 3) Third Coat: Same as second.
 - c. S-W:
 - 1) First Coat: ProMar 200 Zero VOC Interior Latex Primer,
(a) B28W2600.
 - 2) Second Coat: Pre-Catalyzed Water Based Epoxy Semi-Gloss, K46-1150 Series.

Oakton Adjacencies - Toilet Renovations
Des Plaines and Skokie , IL
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021075.001
09 June 2025

- 3) Third Coat: Same as second.

END OF SECTION

SECTION 10 21 13.18

REINFORCED COMPOSITE TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid color, reinforced composite toilet compartments.
- B. Urinal screens.

1.2 RELATED SECTIONS

- A. Section 05 5000 - Metal Fabrications: Concealed steel support members.
- B. Section 06 1000 - Rough Carpentry: Blocking and supports.
- C. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.3 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Product Data: Provide data on panel construction, hardware, and accessories.
Samples: Submit manufacturer's full range of available colors and patterns, for selection.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
1. General Partitions Mfg. Corp.: www.generalpartitions.com.
 2. Global Steel Products Corp.: www.globalpartitions.com.
 2. Accurate Partitions Corp.: www.accuratepartitions.com.
 3. Ampco Products, Inc.: www.ampco.com.
 4. Bobrick Washroom Equipment, Inc.: www.bobrick.com.
 5. Spec-Rite Designs: www.specritedesigns.com.
 6. Substitutions: Section 01 6000 - Product Requirements.

2.2 COMPONENTS

- A. Toilet Compartments: Solid color, reinforced composite panels, floor-mounted headrail-braced.
1. Comply with ASTM E84, Class B, for finish surfaces of partition systems.
- B. Reinforced Composite Doors, Panels, and Pilasters: Dyed organic fibrous material reinforced with polycarbonate and phenolic resins between clear melamine surface sheets fused at high temperature and pressure to form a homogeneous, non-delaminating panel, with homogeneous color throughout; stain resistant to domestic chemicals and cleaners.
1. Color: As selected by Architect from manufacturer's full range of available standards; satin finish.
- C. Door and Panel Dimensions:
1. Thickness: 3/4 inch (19 mm).
 2. Door Width: 24 inch (610 mm).
 3. Door Width for Handicapped Use: 36 inch (915 mm), out-swinging.
 4. Height: 58 inch (1 473 mm).
 5. Thickness of Pilasters: 1/2 inch (12 mm).
- C. Urinal Screens: Wall mounted with continuous panel brackets.
1. Minimum Size: 24 inches wide x 48 inches high, bottom edge positioned 12 inches above floor surface.

2.3 ACCESSORIES

- A. Pilaster Shoes: Formed ASTM A 666, Type 304 stainless steel with No. 4 finish, 3 inches (75 mm) high, concealing floor fastenings.
1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Hollow stainless steel tube, 1 x 1-5/8 inch (25 x 41 mm) size, with anti-grip strips and cast socket wall brackets.
- C. Wall and Pilaster Brackets: Satin stainless steel.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.

1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- E. Steel Plate Reinforcement: Carbon steel, prepared for fasteners, 1/8 inch (3 mm) thick.
- F. Hardware: Satin stainless steel:
 1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 2. Continuous full-height stainless steel hinges with angle brackets and u-channel keepers, self-closing type, adjustable for door close positioning; two per door.
 3. Nylon bearings.
 4. Thumb turn door latch with exterior emergency access feature.
 5. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 6. Coat hook with rubber bumper; one per compartment, mounted on door.
 7. Provide door pull for outswinging doors.
 8. Privacy System: Provide continuous stop and hinge side filler pieces which eliminate sight lines into compartments

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated on Drawings.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 to 1/2 inch (9 to 13 mm) space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch (6 mm).
- B. Maximum Variation From Plumb: 1/8 inch (3 mm).

3.4 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

**SECTION 10 28 00
TOILET ACCESSORIES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Toilet accessories, including installation accessories and materials.
- B. Related Sections:
 - 1. Rough carpentry: Section 06 10 00; for wood blocking in walls
 - 2. Non-load bearing metal framing: section 09 22 16: for metal wall framing and reinforcements
 - 3. Gypsum board: Section 09 21 16.
 - 4. Tiling: Section 09 30 00; for porcelain tile

1.2 SUBMITTALS

- A. Manufacturer`s Literature: Description of each item and installation and operating instructions.

1.3 QUALITY ASSURANCE

- A. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by Basis of Design Products.
- B. Do not modify aesthetic effects, as judged solely by Architect, except with Architect's approval. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver and handle toilet and bath accessories in such a manner as to prevent damage; store in a secure place. Provide accessories in original packaging with seals unbroken and bearing the name of the manufacturer and product. Remove from the job site damaged or otherwise unsuitable items.

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

PART 2 - PRODUCTS

2.1 ITEMS

A. Baby Changing Stations:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Koala Kare; KB110-SSWM or comparable product as approved by Architect.

B. Purse Shelves:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick; B-287 or comparable product as approved by Architect.

C. Grab Bars:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick; B-5806 Series in lengths indicated, or comparable product as approved by Architect.

D. Electric Hand Dryers:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Xlerator; Model XL-W or comparable product as approved by Architect.

E. Framed Mirrors: Stainless steel framed, 6mm thick tempered glass mirrors, in sizes indicated.

F. Owner-Furnished Items: The Owner will furnish the following items for installation by the Contractor:

- 1. Paper towel dispensers.
- 2. Sanitary napkin disposals.
- 3. Sanitary napkin dispensers.
- 4. Toilet paper dispensers.
- 5. Soap dispensers.

2.2 TEMPLATES

- A. Furnish templates to metal toilet partition manufacturer for reinforcing and cut outs required for toilet accessories.

2.3 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- C. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

2.4 FABRICATION

- A. Furnish all fastening devices, including screws, bolts, anchors and backplates. Match exposed portions of fastening devices with that of accessories.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine all surfaces to receive parts of the work specified herein. Verify all dimensions of in-place and subsequent construction. Installation of toilet accessories constitutes acceptance of the existing conditions.

3.2 INSTALLATION

- A. Install toilet accessories only to finished surfaces and after all contiguous work has been completed.
- B. Install toilet accessories in accordance with the manufacturer's printed instructions
- C. In any one space, provide accessories of matching design and finish. If accessories vary in this regard, remove and replaced with items that match.

3.3 CLEANING

- A. Protect toilet accessories from damage after being installed. Before acceptance by Owner, clean and restore finishes; replace any defective parts or units at no additional cost to the Owner. Remove all packing material and construction debris and leave area broom clean.

END OF SECTION