August 31, 2026

PROJECT MANUAL

VOLUME 2 OF 4: Division 02-14

Washingtonville Central School District

2024 Capital Project Phase 3

Washingtonville Middle School	SED No. 44-01-02-06-0-001-023
Washingtonville High School	SED No. 44-01-02-06-0-007-033
Taft Elementary School	SED No. 44-01-02-06-0-002-019

CSArch Project #

228-2401.03



Registration Expiration: 02/29/2028

The design of this project conforms to applicable provisions of the New York State Uniform Fire Prevention and Building Code, the New York State Energy Conservation Construction Code, the Manual of Planning Standards of the New York State Education Department, and the New York State Department of Labor Code Rule #56.

CSARCH

SECTION 022113 - SITE SURVEY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Layout for all site work performed by a licensed surveyor.
   2. Maintaining site control.
   3. Preparing record drawings showing all new utilities and building additions.
   4. Locate property and/or easement lines, building or other facilities that could affect construction.

1.2 DEFINITIONS

A. Licensed Surveyor: Registered in state where project is located and accepted by the Owner's Representative.

1.3 SUBMITTALS

A. Copies of the following will be made available to the Owner's Representative upon request throughout the project. Give the original to the Owner for his permanent files no later than two weeks after Contract completion.
   1. Establish, maintain, and have available for review by the Owner's representative, throughout term of Contract, legible, comprehensive, and complete survey notes, computations, sketches, drawings and similar records kept in a conventional format that is acceptable to the Owner's representative.
   2. Record Plans or As-Builts of all site improvements performed under this Contract. Using the same design system(s), the level accuracy of Record Plans or As-Builts will be equal to that intended on design plans. All data on design plans will be verified or changed to reflect As Built conditions.
   3. All calculations and field notes required to reestablish or modify the original control.

1.4 QUALITY ASSURANCE

A. All survey calculations of field work, where the accuracy could affect construction or the original design intent, shall be performed under the supervision of a Surveyor licensed in the state of the project. If requested by the Owner's representative, the Contractor shall have the portion of survey in question certified that the work was done under the supervision of a licensed Surveyor in the applicable state.

B. Perform survey work in accordance with recognized professional surveying practices, complying with local and state laws, rules and regulations. Ensure work performed by qualified personnel acceptable to Owner's representative.

C. Maintain Project Survey field work in a condition such that it can be checked by the Owner's representative and provide assistance in carrying out these checks. Checking by the Owner's representative does not relieve the responsibilities of this Contract.

1.5 FIELD CONDITIONS

A. No protected areas, site improvements, off-site areas, or any areas to remain will be permanently marked or damaged without written consent of the Owner's representative.

B. All stake-out placed for installation of or performance of site improvements will be maintained in a manner to allow the Owner's representative to perform construction observation.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Surveying instruments and equipment used in performing the Project Survey shall be of the type(s) appropriate for the application at hand and shall be kept in acceptable calibration and good working order.

2.2 MATERIALS

A. All temporary materials used in field shall be weather resistant and of standard quality.

B. All permanent materials incorporated into the project shall be a type that prevents movement from freeze-thaw, minor contact or other expected occurrences and is found to be acceptable by the Owner's representative and local or state authority. When possible, use material specified on the Drawings.

PART 3 EXECUTION

3.1 FIELD

A. All survey layout work shall be tied or referenced to the control survey data shown on the plans or supplied by the Engineer. The existing control shall be maintained in its original condition throughout the term of the Contract. If alteration of the original baseline condition is unavoidable, notify the Engineer of this situation and present a plan and procedure to the Engineer for review to remedy this alteration. Bring any error, apparent discrepancy in or absence of control survey data provided, to the Owner's representative's attention for resolution.

B. At the direction of the Owner, establish, stake and reference all rights-of-way, easement limits, and building corners, and where required, stake under the direction of a licensed Land Surveyor. The licensed Land Surveyor shall, through the Contractor, present to the Engineer a certificate with the professional's seal in an acceptable format that such information has been accomplished under his or her direction.

C. At all times maintain the project survey field work in a condition such that it can be reviewed by the Engineer and render reasonable assistance to the Engineer in carrying out such checks. However, reviewing by the Engineer does not relieve the Contractor of his responsibilities under this Item.

D. Assume sole responsibility for obtaining right of entry to properties, other than those properties on which the Owner has obtained easements with surface rights, for the purpose of conducting layout and survey work.

3.2 RECORD DRAWINGS/AS-BUILT DRAWINGS

A. Upon completion of the work under this Item, present a certificate to the Engineer attached to the As-Built drawings, stating that all of the facilities shown on the Drawings or as may be added, deleted, or altered upon review of the Engineer, have been located in accordance with such Drawings or approved modifications thereof.

END OF SECTION 022113 022113

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SECTION 023313 - UNDERGROUND UTILITY LOCATOR SERVICE

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes:
   1. Requirements and standards for underground utility location services to be completed prior to commencement of construction.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Contract Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.3 REFERENCES

A. American Society of Civil Engineers, CI / ASCE 38 - 02, "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

B. American Public Works Association, Uniform Color Code."

1.4 DEFINITIONS

A. Utility Quality Levels:
   1. Level A: Precise horizontal and vertical location of utilities obtained by the actual exposure (or verification of previously exposed and surveyed utilities) and subsequent measurement of subsurface utilities, usually at a specific point. Minimally intrusive excavation equipment is typically used to minimize the potential for utility damage. A precise horizontal and vertical location, as well as other utility attributes, is shown on plan documents. Accuracy is typically set to 15-mm vertical and to applicable horizontal survey and mapping accuracy as defined or expected by the project owner.
   2. Level B: Information obtained through the application of appropriate surface geophysical methods to determine the existence and approximate horizontal position of subsurface utilities. Quality level B data should be reproducible by surface geophysics at any point of their depiction. This information is surveyed to applicable tolerances defined by the project and reduced onto plan documents.

1.5 DESCRIPTION

A. Retain an independent utility locator service company with a minimum of five (5) years' experience to field locate, mark, and stakeout existing underground utilities and service connections.
   1. Level B locator service shall be performed in all project areas where excavations, regrading of the ground surface, and penetrations of the ground surface are to be performed.
      a. Contractor shall include a minimum of 16 hours of Level A locator service to locate underground utilities as identified on the contract drawings or as identified during the Level B investigation that require more specific location, invert elevation, size, etc. Level A investigation shall only be performed at locations where shown or as directed.
      b. In heavy metal areas, such as near perimeter fences, ground penetrating radar shall be used to determine the location of underground utilities. The use of equipment that induce a tracing signal along the utility path (such as a Metrotech unit) can cause false readings, shall not be used within five feet of fences.
   2. The Level A investigation shall be performed as follows:
      a. Hand excavation may be performed for depths of three feet or less.
      b. Vacuum excavation shall be performed at depths greater than three feet.
      c. All excavation test pits shall be backfilled by close of business that day.
   3. Support and protect all utilities and service connections to remain in place.
   4. The locator service shall field locate and mark underground utilities and service connections prior to excavation.
   5. The contractor shall be responsible for coordinating the extent of the areas of subsurface investigation required to locate all underground utilities and service connections in the areas of excavation.
   6. All costs associated with the repair of underground utilities and service connections hit/damaged during the investigative work shall be the responsibility of the contractor.
   7. Utility location services shall be in accordance with the provisions of CIASCE 38-02, "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

1.6 SUBMITTALS

A. Submit detailed experience and qualifications description of underground utility locator service. Experience and qualifications package should include a description of the types of utility locator equipment and experience that can be provided.

B. Investigative Report:
   1. Submit detailed written report and scaled drawings of the subsurface investigation, documenting all underground utilities and service connections located and identified.

a. All documentation shall be referenced to existing data (horizontal and vertical) previously established.
b. Provide three (3) paper copies and one (1) electronic copy of detailed written report and drawings.
c. Submit Investigative Report at least two weeks prior to advancing construction within the scheduled areas of excavation within the project site.

1.7 COORDINATION AND SCHEDULE

A. Coordinate the Work to determine the extent of the areas of subsurface investigation required to locate all underground utilities and service connections in the areas of excavation.

B. Coordinate the Work with the Owner's Representative to minimize utility disruptions and facility operations. Provide a schedule for the Work required to the Owner's Representative for approval. Upon approval of the schedule, notify the Owner's Representative a minimum of three (3) working days prior to performing the Work.

C. Within the areas of excavation, all underground utilities and service connections shall be field located, and their locations marked at least two (2) weeks prior to the performance of the required excavation work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 WORK AREAS AND PERFORMANCE

A. If any underground utilities and service connections are hit or damaged during the work, immediately inform the Owner and Engineer for directions on how to proceed.

B. The utility locator service investigative work, field location and marking of underground utilities and service connections and submission of the investigative report must be completed before any excavation work can begin.

C. Provide subsurface investigation information, detailed written report and drawings of the subsurface investigation, documenting all underground utilities and service connections located and identified, prior to the performance of the required excavation work.

D. If during the Level B investigations, unknown underground utilities are discovered, the Engineer shall be notified as soon as possible or before the close of that business day.

E. Field Marking of underground utilities shall follow the American Public Works Association (APWA) uniform color code:

1. White: Proposed Excavation.
2. Pink:: Temporary Survey Markings.
3. Red: Electric power lines, cables, conduit, and lighting cables.
4. Yellow: Gas, oil, steam, petroleum, and gaseous material.
5. Orange: Communications, alarm, signal lines, cables, or conduit.
6. Blue: Potable water.
7. Purple: Reclaimed water, irrigation, and slurry lines.
8. Green: Sewer and drain lines.

F. The Owner or Engineer may limit or restrict scheduling of the utility locator service based upon project progress.

END OF SECTION 023313

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected portions of building or structure.
   2. Demolition and removal of selected site elements.
   3. Salvage of existing items to be reused or recycled.

RELATED WORK

SECTION 311000: SITE CLEARING.

3.1 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. 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.

3.2 MATERIALS OWNERSHIP

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

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
   1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

3.3 PRE-DEMOLITION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site.

3.4 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control, and for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities:
   1. Indicate the following:
   2. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's and adjacent land Owners are uninterrupted.
   3. Interruption of utility services. Indicate how long utility services will be interrupted.
   4. Coordination for shutoff, capping, and continuation of utility services.

C. Submit a list of items to be removed, salvaged and reinstalled and deliver to Owner prior to demolition.

D. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

E. Documentation indicated that existing warranties are still in effect after completion of selective demolition.

F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

3.5 CLOSEOUT SUBMITTALS

A. Inventory of items that have been removed and salvaged.

B. Landfill Records if hazardous wastes are encountered, provide receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

3.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

3.7 FIELD CONDITIONS

A. Notify Owner of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

B. Owner will occupy portions of building immediately adjacent to selective demolition area. Arrange selective demolition schedule so as not to interfere with Owner's operations.

C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

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 Owner’s Representative and Owner.

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.

3.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 PRODUCTS

4.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 EXECUTION

5.1 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. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
   1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
   2. Requirement in subparagraph below is for treatment of historic facilities.
   3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

D. 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.

E. Inventory and record the condition of items to be removed and salvaged.

F. PREPARATION

G. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

H. UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

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

J. 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 and Owner.
   2. 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.
   3. 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.

5.2 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.

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.

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

5.3 SELECTIVE DEMOLITION

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. 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.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. 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.
4. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
6. Dispose of demolished items and materials promptly. Comply with requirements in Contract Documents.

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 Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify 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.

D. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner’s Representative, items may be removed to a suitable, protected storage location during selective demolition, then cleaned and reinstalled in their original locations after selective demolition operations are complete.

5.4 CLEANING

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.

B. Burning: Do not burn demolished materials.

C. 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 024119

SECTION 028200 – ASBESTOS ABATEMENT

AT: WASHINGTONVILLE CENTRAL SCHOOL DISTRICT
2024 CAPITAL IMPROVEMENT PROJECT – PHASE 3
52 WEST MAIN STREET
WASHINGTONVILLE, NY 10992
SED # 44-01-02-06-0-001-023 MIDDLE SCHOOL
SED # 44-01-02-06-0-007-033 HIGH SCHOOL

OWNER: WASHINGTONVILLE CENTRAL SCHOOL DISTRICT
2024 CAPITAL IMPROVEMENT PROJECT – PHASE 3
52 WEST MAIN STREET
WASHINGTONVILLE, NY 10992

CONSULTANT: QUALITY ENVIRONMENTAL SOLUTIONS & TECHNOLOGIES, INC. (QUES&T)
1376 ROUTE 9
WAPPINGERS FALLS, NEW YORK 12590
PH. (845) 298-6031
FX. (845) 298-6251



SPECIFICATION DATED: June 6, 2025

PART I – GENERAL

1.01 DESCRIPTION

A. All work under this contract shall be performed in strict accordance with the specifications and all applicable laws for asbestos removal projects. The Abatement Contractor shall furnish all labor, materials, supervision, services, insurance and equipment necessary for the complete and total removal of Asbestos-containing Materials (ACM) as described herein, in attachments to the specification, Job Specific Variance(s) and/or as directed by Washingtonville CSD (here-in-after the "Owner") and/or the Owners Representative(s) to support the to the following 2024 Capital Improvements Project (Phase 2):

- 2024 CAPITAL IMPROVEMENT PROJECT – PHASE 3
  WASHINGTONVILLE CENTRAL SCHOOL DISTRICT
  52 WEST MAIN STREET
  WASHINGTONVILLE, NY 10992
  SED # 44-01-02-06-0-001-023 MIDDLE SCHOOL
  SED # 44-01-02-06-0-007-033 HIGH SCHOOL

B. Abatement Contractor shall provide personnel air monitoring to satisfy OSHA regulation 29 CFR Parts 1926.1101(f). All work performed shall be in strict accordance with applicable provisions and regulations promulgated under New York State Department of Labor, Industrial Code 56 (ICR-56).

C. The Abatement Contractor shall satisfy the requirements for asbestos projects issued by the New York State Department of Labor concerning licensing and certification; notification; equipment; removal and disposal procedures; engineering controls; work area preparation; decontamination and clean-up procedures; and personnel air monitoring.

D. The Abatement Contractor shall be responsible for submittal of asbestos project notification(s) and applicable fees to EPA and NYSDOL concerning this project. Project notification(s) shall be made for the cumulative total of ACM to be removed as required by ICR-56-3.4. Work practices for each individual work area established shall be consistent with the quantity of ACM contained within that work area as defined in ICR-56-2.

E. The scope of work under this contract shall include the following:

1. All asbestos-containing materials (ACM) shall be removed in accordance with these specifications. The Abatement Contractor is responsible for field verification of estimated quantities, locations and other site conditions that may affect work.

2. All fixed objects remaining within the work area(s) shall be protected as required by Title 12 NYCRR Section 56-7.10(b) and as described in these specifications.

3. The containerization, labeling and disposal of all asbestos waste in accordance with applicable city, state and federal regulations and these specifications.

4. The Abatement Contractor will be responsible for repairing all building components damaged during abatement including, but not limited to, ceiling tiles, ceiling finishes, wall finishes and/or floor finishes, etc.

5. The Abatement Contractor shall be responsible for any and all demolition required to access materials identified in scope of work and on associated drawings.

6. Concealed conditions that are exposed and may require additional work shall be brought to the attention of the Owner(s) immediately. The Abatement Contractor shall not abate these areas without a written notice to proceed. If the Abatement Contractor removes additional asbestos prior to the order to proceed the additional work will not be acknowledged.

7. Permissible working hours shall be Monday through Friday 7:00 A.M. to 4:00 P.M. with one (1) hour for lunch and/or as defined by the Owner. Holidays shall be considered weekends and not included for working days. Upon written approval from the Owner, the Abatement Contractor may work past these hours. The Abatement Contractor will incur any and all costs associated for work performed beyond the defined schedule including, but not limited to: abatement activities, project/air monitoring, custodial/staffing labor, overtime, mobilizations, etc.

8. Buildings will be turned over to the Abatement Contractor as is. At that time, all electrical services and HVAC systems in the proposed work areas will be shut down. Electricity and water supply will be maintained in the building for use by the Abatement Contractor. The Abatement Contractor is responsible for securing all power in the work area(s) and establishing all temporary GFCI hookups necessary to complete his work.

9. The Abatement Contractor shall remove identified asbestos-containing floor coverings to the building substrate beneath; in areas indicted. Subsequent to final air clearances, the substrate(s) shall be washed with a neutralizing agent to prepare the substrate to accept new floor covering and eliminate residual odors.

10. The Abatement Contractor must coordinate location of waste containers with the Facility and the Owner. Deliveries and storage of equipment must be coordinated with the Facility and the Owner.

11. All “Large” and “Small” asbestos abatement projects, as defined by 12 NYCRR56 shall not be performed while the building is occupied. The term “building” means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction. The isolated portion of the building must contain exists that do not pass through the occupied portion(s) and ventilation systems must be physically separated and sealed at the isolation barriers.

1.02 PRE-CONTRACT SUBMITTALS

Within three (3) days after bids are opened, the three (3) apparent low bidders shall be required to submit the following documentation:

A. Resume': Shall include the following:

1. Provide a list of projects of similar nature performed within the past two (2) years and include the dollar value of all projects. Provide project references to include owner, consultant, and air monitoring firms' name, contact person, address, and phone number, include location of project and date of completion.

2. Abatement Contractor license issued by New York State Department of Labor for asbestos work in accordance with ICR-56-3.

3. A list of owned equipment available to be used in the performance of the project.

4. The number of years engaged in asbestos removal.

5. An outline of the worker training courses and medical surveillance program conducted by the Abatement Contractor.

6. A standard operating procedures manual describing work practices and procedures, equipment, type of decontamination facilities, respirator program, special removal techniques, etc.

7. Documentation to the satisfaction of the Owner pertaining to the Abatement Contractor's financial resources available to perform the project. Such data shall include, but not be limited to, the firm's balance sheet for the last fiscal year.

B.Citations/Violations/Legal Proceedings

1. Submit a notarized statement describing any citations, violations, criminal charges, or legal proceedings undertaken or issued by any law enforcement, regulatory agency, or consultant concerning performance on previous asbestos abatement contracts. Briefly describe the circumstances citing the project and involved persons and agencies as well as the outcome of any actions.

2. Answer the question: "Has your firm or its agents been issued a Stop Work order on any project within the last two years?" If "Yes" provide details as discussed above.

3. Answer the question: "Are you now, or have you been in the past, a party to any litigation or arbitrations arising out of your performance on Asbestos Abatement Contracts?" If "Yes" provide details as discussed in 1. above.

4. Describe any liquidated damages assessed within the last two years.

C. Preliminary Schedule

1. Provide a detailed schedule including work dates, work shift times, estimate of manpower to be utilized and the start and completion date for completion of each major work area.

1.03 DOCUMENTATION

A. The Abatement Contractor shall be required to submit the following and receive the Consultant's approval prior to commencing work on this project:

1. Provide documentation of worker training for each person assigned to the project. Documentation shall include copies of each workers valid New York State asbestos handler certificates (for those employees who may perform asbestos removal), documentation of current respirator fit test and current OSHA required training and medical examination.

2. The attached "Asbestos Employee Medical Examination Statement" and "Asbestos Employee Training Statement" forms shall be completed, signed and submitted for each worker assigned to the project. Records of all employee training and medical surveillance shall be maintained for at least forty (40) years. Copies of the records shall be submitted to the Consultant prior to commencement.

3. The Abatement Contractor shall submit proof of a current, valid license issued by the New York State Department of Labor pursuant to the authority vested in the Commissioner by section 906 of the Labor Laws, and that the employees performing asbestos related work on this project are certified by the State of New York as required in Part 56 of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York latest edition. Copies of all licenses shall be submitted prior to the commencement of the project.

4. The Abatement Contractor shall submit a written respiratory protection program meeting the requirements of 29 CFR 1910.134 to the Consultant.

5. The name, address, social security number and NYS DOL certificate number of the person(s) who will supervise the asbestos project.

6. The name and address of the deposit or waste disposal site or sites where the asbestos materials are to be deposited or disposed of. This site must be approved by the Owner. The manifesting procedure must also be specified.

7. The name, address and New York State Dept. of Environmental Conservation ID Number of any transporters that are to be used to transport waste.

8. A written Standard Operation Procedure (SOP) that is designed and implemented to maximize protection against human exposure to asbestos dust. The SOP shall take into consideration the workers, visitors, building employees, general public and environment. As a minimum the procedures must include the following:

   a. Security for all work areas on an around-the-clock basis against unauthorized access.

   b. Project organization chart including the phone numbers of at least two responsible persons who shall be authorized to dispatch men and equipment to the project in the event of an emergency; including weekends.

   c. Description of protective clothing and NIOSH approved respirators to be used.

   d. Description of all removal methods to be used, including HEPA air filtration and decontamination sequence with special emphasis on any procedure that may deviate from these specifications.
   e. A list of manufacturers' certificates stating that all vacuums, negative air filtration equipment, respirators and air supply equipment meet OSHA and EPA requirements.

   f. A list of all materials proposed to be furnished and used under this contract.

   g. Emergency evacuation procedures in the event of fire, smoke or accidents such as injury from falling, heat exposure, electrical shock, etc.

   h. The name, address and ELAP number of the New York State Department of Health Certified Analytical Testing Laboratory the Contractor proposes to use for the OSHA monitoring.

9. A detailed plan, in triplicate, for the phasing of the project, division of work areas and location of decontamination facilities, waste containers and temporary office.

10. Work schedule, identifying firm dates and completion for actual areas. Bar chart or critical path chart indicating phases is required.

B. The Abatement Contractor shall post their NYS DOL contractor's license and maintain a daily log documenting the dates and time of the following items within each personal decontamination unit:

1. Meetings; purpose, attendants, discussion (brief)

2. Sign-in and sign-out of all persons entering the work area including name, date, time, social security number, position or function and general description of daily activity.

3. Testing of barriers and enclosure systems using smoke tubes prior to the beginning of abatement activities and at least once a day thereafter until satisfactory clearance air monitoring results have been achieved.

4. Inspection of all plastic barriers, twice daily, by the asbestos supervisor.

5. Loss of enclosure integrity; special or unusual events, barrier breaches, equipment failures, etc.

6. Daily cleaning of enclosures.

7. Personnel air monitoring test results for OSHA Compliance. Results shall be posted at the work site within 24 hours of testing and copies supplied to the Owner within five (5) days of testing. Abnormalities shall be supplied to the Owner immediately.

C. Documentation with confirmation signature of Consultant's representative of the following shall be provided by the Abatement Contractor at the final closeout of the project.

1. Testing of barriers and enclosure systems using smoke tubes shall be performed prior to the beginning of abatement activities and at least once a day thereafter until satisfactory clearance air monitoring results have been achieved.

2. Inspection of all plastic barriers.

3. Removal of all polyethylene barriers.

4. Consultant's inspections prior to encapsulation.
5. Removal of waste materials.

6. Decontamination of equipment (list items).

7. Consultant's final inspection/final air tests.

D. The Abatement Contractor shall provide records of all project information, to include the following which shall be submitted upon completion of the project and prior to approval of

the Abatement Contractor's payment application:

1. The location and description of the abatement project.

2. The name, address and social security number of the person(s) who supervised the asbestos project.

3. Certified payroll documentation Pursuant to Article 8, Section 220 of the NYS Labor Law

4. Copies of EPA/NYSDOL Asbestos Certificates for all Workers and Supervisors employed on the Project.

5. Copies of Medical Approval and Respirator Fit-testing for all Asbestos Workers and Supervisors employed on the Project.

6. Copies of Abatement Contractors Daily Sign-In Sheets & Logs for persons entering and leaving the work area. – Title 12 NYCRR Part 56-7.3.

7. Copies of Abatement Contractor’s personal air sampling laboratory results.

8. The amounts and type of asbestos materials that was removed, enclosed, encapsulated, or disturbed.

9. The name and address of the deposit or waste disposal site or sites where the asbestos waste materials were deposited or disposed of and all related manifests, receipts and other documentation associated with the disposal of asbestos waste.

10. The name and address of any transporters used to transport waste and all related manifests, receipts and other documentation associated with the transport of asbestos waste.

11. All other information that may be required by state, federal or local regulations.

12. Copy of the Supervisor’s Daily Project Log of events as described in 1.03 B, above.

1.04 NOTIFICATIONS AND PERMITS

A. The Abatement Contractor shall be required to prepare and submit notifications to the following agencies at least ten (10) days prior to the commencement of the project:

1. Asbestos NESHAPS Contact
   U.S. Environmental Protection Agency
   NESHAPS Coordinator, Air Facilities Branch
   26 Federal Plaza

New York, New York 10007
(212) 264-7307

2. State of New York Department of Labor
   Division of Safety and Health
   Asbestos Control Bureau
   State Office Building Campus, Building 12, Room 454
   Albany, New York 12240

3. Owner(s): Washingtonville Central School District
   52 West Main Street
   Washingtonville, NY 10992
   ATTN: Jack Rallo
   Ph. (845) 691-1000
   E-mail. jrallo@wcsdk12.org

4. Owner's Representative(s): CS Arch
   19 Front Street
   Newburgh, NY 12550
   ATTN: Tom Ritzenthaler
   Ph. (845) 561-3179
   E-mail. tritzenthaler@csarchpc.com

5. Environmental Consultant(s): Quality Environmental Solutions & Technologies, Inc. (QuES&T)
   1376 Route 9
   Wappingers Falls, New York 12590
   ATTN: Todd McAfee
   Ph. (845) 298-6031
   Fx. (845) 298-6251
   E-mail. tmcafee@qualityenv.com

B. The notification shall include but not be limited to the following information:

1. Name and address of Owner.

2. Name, address and asbestos handling license number of the Abatement Contractor.

3. Address and description of the building, including size, age, and prior use of the building or area; the amount, in square feet or linear feet of asbestos material to be removed; room designation numbers or other local information where asbestos material is found, including the type of asbestos material (friable or non-friable).

4. Scheduled starting and completion dates for removal.

5. Methods to be employed in abating asbestos containing materials.

6. Procedures and equipment, including ventilating/exhaust systems, that will be employed to comply with the Code of Federal Regulation (CFR) Title 40, Part 61 of the U.S. Environmental Protection Agency.

7. The name and address of the carting company and of the waste disposal site where the asbestos waste will be deposited.

NOTE: Notifications shall be submitted using standard forms as may be used by the respective agency.

For DOL (NYS) include "Asbestos Project Notification" form (DOSH-483) with proper fee, if required. For EPA include "Notification of Demolition and Renovation"; 40 CFR Part 61.

C. The Abatement Contractor shall secure any permits required by the city, town, county, or state that may be required and the cost for obtaining the permit shall be included in his base bid.

D. The Abatement Contractor shall erect warning signs around the work space at every point of potential entry into the work area in accordance with OSHA 1926.58k (2), (i). These signs shall bear the following information:

DANGER
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE
CLOTHING
ARE REQUIRED IN THIS AREA

E. The Abatement Contractor shall post at entrances to the work place and immediate adjacent areas, notifications to building occupants, which include the name and license number of the contractor, project location and size, amount and type of ACM, abatement procedures, dates of expected occurrence and name and address of the air monitor and laboratory in compliance with ICR 56-3.6.

F. The Abatement Contractor shall post a list of emergency telephone numbers at the job site which shall include the Owner's Representative, police, emergency squad, local hospital, Environmental Protection Agency, N.Y. State Department of Labor, Occupational Safety and Health Administration and the local Department of Health.

1.05 APPLICABLE STANDARDS

Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, applicable standards of the construction industry have the same force and effects (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith. Resolution of overlapping and conflicting requirements, which result from the application of several different industry standards to the same unit of work, shall be by adherence to the most stringent requirement.

A. Applicable standards listed in these Specifications form a part of this Specification and include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. ANSI:
   American National Standards Institute
   1430 Broadway
   New York, New York 10018

2. ASHRAE:
   American Society for Heating, Refrigerating
   and Air Conditioning Engineers
   1791 Tullie Circle NE
   Atlanta, Georgia 30329

3. ASTM:
   American Society for Testing and Materials
   1916 Race Street
   Philadelphia, Pennsylvania 19103

4. CFR
   Code of Federal Regulations Available
   from Government Printing Office
   Washington, District of Columbia 20402

5. CGA
   Compressed Gas Association
   1235 Jefferson Davis Highway
   Arlington, Virginia 22202

6. CS
   Commercial Standard of NBS
   (US Dept. of Commerce)
   Government Printing Office

7. EPA

   Environmental Protection Agency, Region II
   26 Federal Plaza
   New York, New York 10007
   Asbestos Coordinator - Room 802
   (212) 264-9538
   Part 61, Sub-Parts A & B
   National Emission Standard for Asbestos

8. FEDERAL SPECS

   Federal Specification (General Services Administration)
   7th and D Street, SW
   Washington, District of Columbia 20406

9. NBS

   National Bureau of Standards
   (US Department of Commerce)
   Gaithersburg, Maryland 20234

10. NEC

    National Electrical Code (by NFPA)

11. NFPA

    National Fire Protection Association
    Batterymarch Park
    Quincy, Massachusetts 02269

12. NIOSH

    National Institute for Occupational Safety and Health
    26 Federal Plaza
    New York, New York 10007

13. NYSDOH

    New York State Department of Health
    Bureau of Toxic Substance Assessment
    Room 359 - 3rd Floor
    Tower Building Empire State Plaza
    Albany, New York 12237

14. NYSDEC

    New York State Department of Environmental Conservation
    Room 136
    50 Wolf Road
    Albany, New York 12233-3245

15. NYSDOL

State of New York Department of Labor
Division of Safety and Health
Asbestos Control Program
State Campus, Building 12
Albany, New York 12240

16. OSHA

Occupational Safety and Health Administration
(US Department of Labor)
New York Regional Office - room 3445
1515 Broadway
New York, New York 10036

17. UL

Underwriters Laboratories
333 Pfingsten Road
Northbrook, Illinois 60062

B. Federal Regulations: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA):

a. Asbestos Regulations
Title 29, Part 1910, of the Code of Federal Regulations.

b. Respiratory Protection
Title 29, Part 1910, Section 134 of the Code of Federal Regulations.

c. Construction Industry
Title 29, Part 1926, of the Code of Federal Regulations.

d. Access to Employee Exposure & Medical Records
Title 29, Part 1910, Section 20 of the Code of Federal Regulations.

e. Hazard Communication
Title 29, Part 1910, Section 1200 of the Code of Federal Regulations.

f. Specifications for Accident Prevention Signs and Tags
Title 29, Part 1910, section 145 of the Code of Federal Regulations.

2. U.S. Environmental Protection Agency (EPA):

a. Asbestos Hazard Emergency Response Act (AHERA) Regulation Asbestos Containing Materials in Schools Final Rule & Notice Title 40, Part 763, Subpart E of the Code of Federal Regulations.

b. Worker Protection Rule
40 CFR Part 763, Subpart G, CPTS 62044, FLR 2843-9
Federal Register, Vol. 50, No. 134, 7/12/85, P28530-28540

c. Regulation for Asbestos
Title 40, Part 61, Subpart A of the Code of Federal Regulations

d. National Emission Standard for Asbestos
Title 40, Part 61, Subpart M (Revised Subpart B) of the Code of Federal Regulations

e. Resource Conservation and Recovery Act (RCRA) 1976, 1980
Hazardous and Solid Waste Amendments (HSWA) 1984
Subtitle D, Subtitle C

3. U.S. Department of Transportation (DOT):

a. Hazardous Substances: Final Rule Regulation 49 CFR, Part 171 and 172.

C. State Regulations: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. New York State Department of Environmental Conservation (DEC) Regulations regarding waste collection registration. Title 6, Part 364 of the New York State Official Compilation of Codes, Rules and Regulations - 6NYCRR 364.

2. New York State Right-To-Know Law

3. New York State Department of Labor Asbestos Regulations Industrial Code Rule 56.

4. NYSDOH Title 10 Part 73 – Asbestos Safety Program and Environmental Laboratory Approval Program.

D. Standards: Those which govern asbestos abatement work or hauling and disposal of asbestos waste materials:

1. American National Standards Institute (ANSI)

a. Fundamentals Governing the Design and Operation of Local Exhaust Systems Publication Z9.2-79

b. Practices for Respiratory Protection
Publication Z88.2-80

E. Guidance Documents: Those that discuss asbestos abatement work or hauling and disposal of asbestos waste materials are listed below only for the Abatement Contractor's information. These documents do not describe the work and are not a part of the work of this contract.

EPA:

1. Guidance for Controlling Asbestos Containing Materials in Buildings (Purple Book) EPA560/5-85-024.

2. Asbestos Waste Management Guidance EPA 530-SW-85-007.

F. Patents and Royalties: The Abatement Contractor shall pay all royalties and/or license fees. The Abatement Contractor shall defend all suits and claims for infringement of any patent rights and save the Owner and Consultant harmless from loss including attorney fees on account thereof.

1.06 DEFINITIONS

As used in or in connection with these specifications the following are terms and definitions.

Abatement - Procedure to control release from asbestos material. This includes removal, encapsulation and enclosure.

Aggressive sampling - A method of sampling in which the person collecting the air sample creates activity by the use of mechanical equipment during the sampling period to stir up settled dust and simulate activity in that area of the building.

AIHA - The American Industrial Hygiene Association, 475 Wolf Ledges Parkway, Akron, Ohio 44311.

Airlock - A system for permitting entrance and exit while restricting air movement between a containment area and an uncontaminated area. It consists of two curtained doorways separated by a distance of at least three feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow-through contamination.

Air sampling - The process of measuring the content of a known volume of air collected during a specific period of time.

Amended water - Water to which a surfactant has been added.

Approved asbestos safety program - A program approved by the Commissioner of Health providing training in the various disciplines that may be involved in an asbestos project.

Area air sampling - Any form of air sampling or monitoring where the sampling device is placed at some stationary location.

Asbestos - Any naturally occurring hydrated mineral silicate separable into commercially usable fibers, including chrysotile (serpentine), amosite (cumingtonite-gunerite), crocidolite (riebeckite), tremolite, anthophyllite and actinolite.

Asbestos contract - An oral or written agreement contained in one or more documents for the performance of work on an asbestos project and includes all labor, goods and service.

Asbestos handler - An individual who installs, removes, applies, encapsulates, or encloses asbestos or asbestos material, or who disturbs friable asbestos. Only individuals certified by NYS Department of Labor shall be acceptable for work under this specification.

Asbestos handling certificate - A certificate issued by the Commissioner of Labor of the State of New York, to a person who has satisfactorily completed an approved asbestos safety program.

Asbestos project - Work undertaken by a contractor which involves the installation, removal, encapsulation, application or enclosure of any ACM or the disturbance of friable ACM.

Asbestos Safety Technician (AST) - Individual designated to represent the Consultant, perform third party monitoring and perform compliance monitoring at the job site during the asbestos project.

Asbestos waste material - Asbestos material or asbestos contaminated objects requiring disposal.

Authorized visitor - The building owner, his or her representative or any representative of a regulatory or other agency having jurisdiction over the project.

Background level monitoring - A method used to determine ambient airborne concentrations inside and outside of a building or structure prior to starting an abatement project.

Building owner - The person in whom legal title to the premises is vested unless the premises are held in land trust, in which instance Building Owner means the person in whom beneficial title is vested.

Clean room - An uncontaminated area or room that is a part of the personal decontamination enclosure with provisions for storage of persons' street clothes and protective equipment.

Cleanup - The utilization of HEPA vacuuming to control and eliminate accumulations of asbestos material and asbestos waste material.

Clearance air monitoring - The employment of aggressive sampling techniques with a volume of air collected to determine the airborne concentration of residual fibers upon conclusion of an asbestos abatement project.

Commissioner - Commissioner of the New York State Department of Labor.

Contractor - A company, unincorporated association, firm, partnership or corporation and any owner or operator thereof, which engages in an asbestos project or employs persons engaged in an asbestos project.

Curtained doorway - A device that consists of at least three overlapping sheets of plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and the left side. All sheets shall have weights attached to the bottom to insure that the sheets hang straight and maintain a seal over the doorway when not in use.

Decontamination enclosure system - A series of connected rooms, separated from the work area and from each other by air locks, for the decontamination of persons, materials, equipment, and authorized visitors.

Encapsulant (sealant) or encapsulating agent - A liquid material that can be applied to asbestos material and which prevents the release of asbestos from the material by creating a membrane over the surface.

Enclosure - The construction of airtight walls, ceilings and floors between the asbestos material and the facility environment, or around surfaces coated with asbestos materials, or any other appropriate procedure that prevents the release of asbestos materials.

Equipment room - A contaminated area or room that is part of the personal decontamination enclosure system with provisions for the storage of contaminated clothing and equipment.

Fixed object - A unit of equipment, furniture or other fixture in the work area which cannot be readily removed from the work area.

Friable Asbestos Material - That condition of crumbled, pulverized, powdered, crushed or exposed asbestos capable of being released into the air by hand pressure.

Friable material containment - The encapsulation or enclosure of any friable asbestos material.

Glovebag technique - A method for removing asbestos material from heating, ventilating, and air conditioning (HVAC) ducts, piping runs, valves, joints, elbows, and other nonplanar surfaces in a noncontained work area. The glovebag assembly is a manufactured device consisting of a glovebag constructed of at least six mil transparent plastic, two inward-projecting longsleeve gloves, which may contain an inward projecting waterwand sleeve, an internal tool pouch, and an attached, labeled receptacle or portion for asbestos waste. The glovebag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and to contain all asbestos fibers released during the abatement process.

HEPA filter - A high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particulate greater than 0.3 microns equivalent aerodynamic diameter.

HEPA vacuum equipment - Vacuuming equipment with a high efficiency particulate air filtration system.

Holding area - A chamber in the waste decontamination enclosure located between the washroom and an adjacent uncontaminated area.

Homogeneous work area - A site within the abatement work area that contains one type of asbestos material and where one type of abatement is used.

Large asbestos project - An asbestos project involving the installation, removal, disturbance, enclosure, or encapsulation of 160 square feet or more of asbestos or asbestos material or 260 linear feet or more of asbestos or asbestos material.

Minor asbestos project - An asbestos project involving the installation, removal, disturbance, enclosure, or encapsulation of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material.

Movable object - A unit of equipment, furniture or fixture in the work area that can be readily removed from the work area.

Negative air pressure equipment - A local exhaust system equipped with HEPA filtration. The system shall be capable of creating and maintaining a negative pressure differential between the outside and the inside of the work area.

Non-asbestos material - Any material containing one percent or less asbestos by weight.

Occupied area - Any frequented portion of the work site where abatement is not taking place.

Outside air - The air outside the building or structure.

Personal air monitoring - A method used to determine an individuals exposure to airborne contaminants. The sample is collected outside the respirator in the person's breathing zone.

Plasticize - To cover floors, walls, ceilings and other surfaces with 6 mil fire retardant plastic sheeting as herein specified.

Project - Any form of work performed in connection with the abatement of asbestos or alteration, renovation, modification or demolition of a building or structure that may disturb asbestos or asbestos material.

Removal - The stripping of any asbestos material.

Repair - Corrective action using required work practices to control fiber release from damaged areas.

Respiratory protection - Respiratory protection required of licensed asbestos workers and authorized visitors in accordance with the applicable laws.

Satisfactory clearance air monitoring results - For all post- abatement samples, airborne concentrations of total fibers that are less than 0.01 fibers per cubic centimeter or background levels, whichever are greater, using phase contrast microscopy (PCM).

Shower room - A room between the clean room and the equipment room in the personal decontamination enclosure with hot and cold running water controllable at the top and arranged for complete showering during decontamination.

Small asbestos project - An asbestos project involving the installation, removal, disturbances, enclosure, or encapsulation of more than 10 and less than 160 square

feet of asbestos or asbestos material of more than 25 and less than 260 linear feet of asbestos or asbestos material.

Staging area - The area near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.

Surfactant - A chemical wetting agent added to water to improve its penetration.

Visible emissions - An emissions of particulate material that can be seen without the aid of instruments.

Washroom - A room between the work area and the holding area in the waste decontamination enclosure system, where equipment and waste containers are wet cleaned and/or HEPA vacuumed.

Waste decontamination enclosure system - An area, consisting of a washroom and a holding area, designated for the controlled transfer of materials and equipment.

Wet cleaning - The process of eliminating asbestos contamination from surfaces, equipment or other objects by using cloths, mops, or other cleaning tools.

Work area - Designated rooms, spaces, or areas where asbestos abatement takes place.

Work site - Premises where asbestos abatement is taking place.

Work Surface - Substrate surface from which asbestos-containing material has been removed.

1.07 UTILITIES, SERVICE AND TEMPORARY FACILITIES

A. The Owner shall make available to the Abatement Contractor all reasonable amounts of water and electrical power at no charge.

B. The Abatement Contractor shall provide, at his own expense, all electrical, water, and waste connections, extensions, and construction materials, supplies, etc. All connections must be approved in advance by the Owner and all work relative to the utilities must be in accordance with the applicable building codes.

C. The Abatement Contractor shall provide scaffolding, ladders and staging, etc. as necessary to accomplish the work of this contract. The type, erection and use of all scaffolding, ladders and staging, etc. shall comply with all applicable OSHA provisions.

D. All connections to the Owner's water system shall include reduced pressure backflow protection or double check and double gate valves. Valves shall be temperature and

pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.

E. The Abatement Contractor shall use only heavy duty abrasion resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water to each work area and to each decontamination unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment. All water must be shut off at the end of each shift.

F. The Abatement Contractor shall provide service to decontamination unit electrical subpanel with minimum 60 amp, 2 pole circuit breaker or fused disconnect and ground-fault circuit interrupters (GFCI), reset button and pilot light, connected to the building's main distribution panel. Subpanel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work. This electrical subpanel shall be used for hot water heater, PAPR battery recharging and air sampling pumps.

G. The Abatement Contractor shall provide UL rated 40-gallon electric hot water heater to supply hot water for the decontamination unit shower. Activate from 30 amp circuit breaker on the electrical subpanel located within the decontamination unit. Provide with relief valve compatible with water heater operation; relief valve down to drip pan on floor with type L copper. Wiring of the hot water heater shall be in compliance with NEMA, NEC, and UL standards.

H. The Abatement Contractor shall provide identification warning signs at power outlets, which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 plugs into higher voltage outlets. Dry transformers shall be provided where required to provide voltages necessary for work operations. All outlets or power supplies shall be protected by ground fault circuit interrupter (GFCI) at the power source.

I. The Abatement Contractor shall use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.

J. The Abatement Contractor shall provide general service incandescent lamps of wattage indicated or required for adequate illumination; Protect lamps with guard cages or tempered glass enclosures; Provide exterior fixtures where fixtures are exposed to moisture.

K. The Abatement Contractor shall provide temporary heat or air conditioning as necessary to maintain comfortable working temperatures inside and immediately outside the work areas. Heating and A/C equipment shall have been tested and labeled by UL, FM or another recognized trade association related to the fuel being used. Fuel burning heaters shall not be used inside containment areas. The Contractor shall also provide a comfortable working environment for occupied areas that are impacted by the asbestos removal.

L. The Abatement Contractor shall comply with recommendations of the NFPA standard in regard to the use and application of fire extinguishers. Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each work area, equipment room, clean room and outside the work area

1.08 REMOVAL OF FIXTURES

A. In locations where the Abatement Contractor is directed to dispose of fixtures he shall either decontaminate the fixtures and dispose of them as non-asbestos containing materials or he shall place them in an appropriate container and dispose of them as asbestos containing material.

B. In locations where the Abatement Contractor is directed to remove and reinstall fixtures, the fixtures shall be removed, decontaminated, labeled, protected with plastic and stored by the contractor in a location as directed by the Owner.

C. Upon completion of the asbestos removal and upon receiving satisfactory clearance air monitoring results, all items to be replaced shall be restored to their original location and reinstalled by the Abatement Contractor.

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. GENERAL REQUIREMENTS

1. Materials shall be stored off the ground, away from wet or damp surfaces and under protective cover to prevent damage or contamination.

2. Damaged or deteriorating materials shall not be used and shall be removed from the premises.

3. Power tools used to drill, cut into, or otherwise disturb asbestos material shall be equipped with HEPA filtered local exhaust ventilation.

4. The Abatement Contractor shall make available to authorized visitors, ladders and/or scaffolds of sufficient dimension and quantity so that all work surfaces can be easily and safely reached for inspection. Scaffold joints and ends shall be sealed with tape to prevent incursion of asbestos. Scaffolds and ladders shall comply with all applicable codes.

B. PLASTIC BARRIERS (POLYETHYLENE)

1. In sizes and shapes to minimize the number of joints.

   a. Six mil. (.006") fire-retardant for vertical protection (walls, entrances and openings).

   b. Six mil. (.006") fire-retardant for horizontal protection (fixed equipment) and heating grilles.

   c. Six mil. (.006") reinforced fire-retardant for floors of decon units.

2. Provide two (2) layers over all roof, wall and ceiling openings. Floor penetrations shall be sealed with a rigid material prior to plasticizing to prevent tripping and fall hazards. All seams within a layer shall be separated by a minimum distance of six feet and sealed airtight. All seams between layers shall be staggered.

3. Barrier Attachment - Commercially available duct tape (fabric or paper) and spray-on adhesive. Duct tape shall be capable of sealing joints of adjacent sheets of plastic, facilitating attachment of plastic sheets to finished or unfinished surfaces of dissimilar materials and adhering under both dry and wet conditions.

C. SIGNS

1. Danger signs shall be provided and shall conform to 29 CFR 1926.1101 and be 14" x 20". These signs shall bear the following information:

DANGER ASBESTOS CANCER AND LUNG DISEASE HAZARD RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

D. DANGER LABELS AND TAPE

1. Labels shall be affixed to any asbestos contaminated material in accordance with the

requirements of 29 CFR 1910.1200 (f) of OSHA's Hazard Communication Standard, and shall contain the following information:

DANGER CONTAINS ASBESTOS FIBERS AVOID BREATHING DUST CANCER AND LUNG DISEASE HAZARD

2. A label shall be affixed on each container of asbestos waste in accordance with the requirements of 49 CFR Parts 171 and 172, Hazardous Substances; Final Rule (U.S. Department of Transportation), and shall contain the following information:

RQ HAZARDOUS SUBSTANCE SOLID, NOS, ORM-E, NA 9188 (ASBESTOS)

3. A label shall be affixed on each container of asbestos waste in accordance with the requirements of 40 CFR Part 61.150, NESHAP; Asbestos; Final Rule (USEPA) and shall contain the name of the waste generator and the location at which the waste was generated.

NOTE: All containers marked as above (1, 2 and 3) shall be disposed of as asbestos waste.

4. Provide 3" red barrier tape printed with black lettered "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos work area.

E. PROTECTIVE EQUIPMENT

1. Respiratory Requirements

a. Where fiber levels permit, and in compliance with regulatory requirements, Powered Air Purifying Respirators are the minimum allowable respiratory protection permitted to be utilized during removal operations.

b. Where not in violation of NIOSH, OSHA, and any other regulatory requirements, the Abatement Contractor shall provide the following minimum respiratory protection to the maximum use concentrations indicated:

MSHA/NIOSH Approved Respiratory Protection	Maximum Use Concentration
Half-Mask Air Purifying with HEPA Filters	10x PEL
Full-Facepiece Air Purifying HEPA Filters and Quantitative Fit Test	10x PEL
Powered Air Purifying (PAPR), Loose fitting Helmet or Hood, HEPA Filter	25x PEL
Powered Air Purifying (PAPR), Full Facepiece, HEPA Filter	50x PEL
Supplied Air, Continuous Flow Loose fitting Helmet or Hood	25x PEL
Supplied Air, Continuous Flow Full Facepiece, HEPA Filter	50x PEL
Full Facepiece-Supplied Air Pressure Demand, HEPA Filter	100x PEL
Full Facepiece-Supplied Air Pressure Demand, with Aux. SCBA, Pressure Demand or Continuous Flow	>100x PEL

2. Disposable Clothing -"Tyvek" manufactured by Dupont or approved equal.

3. NIOSH approved safety goggles to protect eyes.

4. Polyethylene bags, 6 mil. (.006") thick (use double bags).

NOTE: Workers must wear disposable coveralls and respirator masks at all times while in the work area. Contaminated coveralls or equipment must be left in work area and not worn into other parts of the building.

F. TOOLS AND EQUIPMENT

1. Airless Sprayer - An airless sprayer, suitable for application of encapsulating material, shall be used.

2. Scaffolding - Scaffolding, as required to accomplish the specified work, shall meet all applicable safety regulations.

3. Transportation Equipment - Transportation equipment, as required, shall be suitable for loading, temporary storage, transport and unloading of contaminated waste without exposure to persons or property. Water tight, hard wall containers shall be provided to retain and dispose of any asbestos waste material with sharp-edged components that may tear plastic bags or sheeting. The containers shall be marked with danger labels.

4. Surfactant - Wetting Agents - "Asbestos-Wet" - Aquatrols Corp. of America or approved equal, and shall be non- carcinogenic.

5. Portable (negative air pressure) asbestos filtration system - by Micro-Trap, or approved equal.

6. Vacuum, HEPA type equal to "Nilfisk" #GA73, or "Pullman/Holt" #75 ASA.

7. Amended Water Sprayer - The water sprayer shall be an airless or other low-pressure sprayer for amended water application.

8. Other Tools and Equipment - The Abatement Contractor shall provide other suitable tools for the stripping, removal, encapsulation, and disposal activities including but not limited to: hand-held scrapers, nylon brushes, sponges, rounded edge shovels, brooms, and carts.

PART 3 – EXECUTION

3.01 PRE-ABATEMENT WORK AREA PREPARATION

A. The work area shall be vacated by the occupants prior to work area preparation and not reoccupied until satisfactory clearance air monitoring results have been achieved.

B. Caution signs shall be posted at all locations and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted that permit a person to read the sign and take the necessary protective measures to avoid exposure.

C. Shut down and lock out electric power to all work areas. The Abatement Contractor shall provide temporary power and lighting and ensure safe installation of temporary power sources and equipment used where high humidity and/or water shall be sprayed in accordance with all applicable codes. All power to work areas shall be brought in from outside the area through a ground-fault interrupter at the source.
D. Isolate the work area HVAC system.

E. The personnel decontamination enclosure system shall be installed or constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material. The waste decontamination enclosure system shall be installed or constructed prior to commencement of abatement activities.

F. Movable objects within the work area shall be pre-cleaned using HEPA filtered vacuum equipment an/or wet cleaning and such objects shall be removed from the work area to an uncontaminated location. If disposed of as asbestos waste material, cleaning is not required.

G. Fixed objects and other items, which are to remain within the work area, shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Such objects shall be enclosed with two layers of at least six mil plastic sheeting and sealed with tape.

H. The work area shall be pre-cleaned using HEPA filtered vacuum equipment and/or wet cleaning. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall be prohibited. Asbestos material shall not be disturbed during pre-cleaning.

I. Isolation barriers that seal off all openings, including windows, corridors, doorways, ducts, and any other penetrations of the work area, shall be constructed using two layers of at least six mil fire-retardant plastic sheeting sealed with tape. Also, all seams in mechanical system components that pass through the work area shall be sealed. Doorways and corridors, which shall not be used for passage during work, shall also be sealed.

J. Removal of mounted objects. After isolation barriers are in place, objects such as light fixtures, electrical track, alarm systems, ventilation equipment and other items not previously sealed, shall be double sealed with six mil fire-retardant plastic sheeting. Localized HEPA filtered vacuum equipment shall be used during fixture removal to reduce asbestos dispersal.

K. Individual roof and floor drains shall be sealed watertight using two layers of 6-mil fire-retardant plastic sheeting and tape prior to plasticizing. Openings in floor shall be fully covered with plywood sheeting secured to the floor in such a way as to minimize a tripping hazard prior to plasticizing.

L. Emergency and fire exits from the work area shall be maintained or alternate exits shall be established according to all applicable codes.

M. Adequate toilet facilities shall be supplied by the Abatement Contractor and shall be located either in the clean area of the personnel decontamination enclosure or shall be readily accessible to the personnel decontamination enclosure.

3.02 LARGE ASBESTOS PROJECT PERSONNEL DECONTAMINATION ENCLOSURE SYSTEM (ICR 56-7.5)

A. The personnel decontamination enclosure shall be constructed prior to preparatory work in the work area and in particular before the disturbance of asbestos material.

1. Construction and use of personnel decontamination enclosure systems shall be in accordance with ICR-56 and any Applicable or Site Specific Variances utilized on this project. Such systems may consist of existing rooms outside of the work area, if the layout is appropriate, that can be enclosed is plastic sheeting and are accessible from the work area. When this situation does not exist, enclosure systems may be constructed out of metal, wood or plastic support.

2. The personnel decontamination enclosure system shall consist of a clean room, a shower room, and an equipment room, in series, separated from each other and from the work area by three airlocks.

3. There shall be one shower per six full shift abatement persons calculated on the basis of the largest shift.

4. The personnel decontamination enclosure system shall be fully framed, sheathed for safety and constructed to prevent unauthorized entry.

5. Personnel decontamination enclosure systems constructed at the work site shall utilize at least six mil fire-retardant opaque plastic sheeting. At least two layers of six mil fire-retardant reinforced plastic sheeting shall be used for the flooring of this area.

6. All prefabricated decontamination units shall be completely decontaminated and sealed prior to separation and removal from the work area. Mobile decontamination units shall remain in place until satisfactory clearance results have been attained.

7. The clean room shall be sized to accommodate all authorized persons. Benches, lockers and hooks shall be provided for street clothes. Shelves for storing respirators shall also be provided. Clean clothing, replacement filters for respirators, towels and other necessary items shall be provided. The clean room shall not be used for the storage of tools, equipment or materials. It shall not be used for office space. A lockable door shall be provided to permit access to the clean room from outside the work area or enclosure. It shall be used to secure the work area and decontamination enclosure during off-shift hours.

8. The shower room shall contain one or more showers. Each shower head shall be supplied with hot and cold water adjustable at the tap. The shower enclosure shall be constructed to ensure against leakage of any kind. Uncontaminated soap, shampoo and

towels shall be available at all times. Shower water shall be drained, collected and filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste. The shower room shall be constructed in such way that travel through the decontamination unit shall be through the shower.

9. The equipment room shall be used for the storage of equipment and tools after decontamination using a HEPA filtered vacuum and/or wet cleaning. A one day supply of replacement filters, in sealed containers, for HEPA vacuums and negative pressure ventilation equipment, extra tools, containers of surfactant and other materials and equipment that may be required during the abatement project may also be stored here. A walk-off pan filled with water shall be located in the work area just outside the equipment room for persons to clean foot covering when leaving the work area. A drum lined with a labeled, at least six mil plastic bag is required for collection of clothing and shall be located in this room. Contaminated footwear and work clothes shall be stored in this area.

3.03 WASTE DECONTAMINATION ENCLOSURE SYSTEM (ICR 56-7.5)

A. General Requirements

1. A waste decontamination enclosure system shall consist of the following:

   a. A washroom/cleanup room shall be constructed with an airlock doorway to the work area and another airlock doorway to the holding area.

   b. The holding area shall be constructed with an airlock doorway to the washroom/cleanup room and another lockable door to the outside.

2. Where there is only one egress from the work area, the holding area of the waste decontamination enclosure system may branch off from the equipment decontamination room, which doubles as a waste washroom, of the personnel decontamination enclosure.

3. The waste washroom shall be equipped with a drain installed to collect water and deliver it to the shower drain where it shall be filtered through a system with at least 5.0 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in accordance with applicable codes. Contaminated filters shall be disposed of as asbestos waste.
4. The waste washroom shall be constructed in such a way that travel through the rooms shall be through the waste washroom

3.04 WORK AREA ENTRY AND EXIT PROCEDURES

A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved:

1. All persons shall enter and exit the work area through the personnel decontamination enclosure system.

2. All persons who enter the work area or an enclosure shall sign the entry/exit log, located in the clean room, upon every entry and exit.

3. All persons, before entering the work area, or an enclosure shall read and be familiar with all posted regulations, personal protection requirements, including work area entry and exit procedures, and emergency procedures. The entry/exit log headings shall indicate, and the signatures shall be used to acknowledge, that these have been reviewed and understood by all persons prior to entry.

4. All persons shall proceed first to the clean room, remove all street clothing, store these items in clean sealable plastic bags or lockers and don coveralls, head covering, foot covering and gloves. All persons shall also don NIOSH approved respiratory protection. Clean respirators and protective clothing shall be utilized, by each person, for each separate entry into the work area. Respirators shall be inspected prior to each use and tested for proper seal using quantitative or qualitative fit checks.

5. Persons wearing designated personal protective equipment shall proceed from the clean room through the shower room to the equipment room, where necessary tools are collected and any additional clothing shall be donned, before entry into the work area.

6. Before leaving the work area, all persons shall remove gross contamination from the outside of respirators and protective clothing by brushing, wet cleaning, and/or HEPA vacuuming.

7. Persons shall proceed to the equipment room where all coveralls, head covering, foot covering and gloves shall be removed. Disposable clothing shall be deposited into labeled containers for disposal. Reusable contaminated clothing, footwear, head gear and gloves shall be stored in the equipment room when not being used in the work area.

8. Still wearing respirators, persons shall proceed to the shower area, clean the outside of the respirator and the exposed face area under running water prior to removal of the respirator, and then fully and vigorously shower and shampoo to remove residual asbestos contamination. Respirators shall be washed thoroughly with soap and water. Some types of respirators will require slight modification of these procedures. An airline respirator with HEPA filtered disconnect protection shall be disconnected in the equipment room and worn into the shower. A powered air-purifying respirator facepiece

shall be disconnected from the filter/power pack assembly prior to entering the shower.

9. After showering and drying, all persons shall proceed to the clean room and don clean personal protective equipment if returning to the work area or street clothing if exiting the enclosure.

3.05 EQUIPMENT AND WASTE CONTAINER DECONTAMINATION & REMOVAL PROCEDURES

A. The following procedures shall be followed throughout the asbestos abatement project until satisfactory clearance air monitoring results have been achieved.

1. External surfaces of contaminated containers and equipment shall be cleaned by wet cleaning and/or HEPA vacuuming in the work area before moving such items into the waste decontamination enclosure system airlock by persons assigned to this duty. These work area persons shall not enter the airlock.

2. These contaminated items shall be removed from the airlock by persons stationed in the washroom during waste removal operations. These washroom persons shall remove gross contamination from the exterior of their respirators and protective clothing by brushing, HEPA vacuuming and/or wet cleaning.

3. Once in the waste decontamination enclosure system, external surfaces of contaminated containers and equipment shall be cleaned a second time by wet cleaning.

4. The cleaned containers of asbestos material and equipment are to be dried of any excessive pooled or beaded liquid, placed in uncontaminated plastic bags or sheeting and sealed airtight.

5. The clean recontainerized items shall be moved into the airlock that leads to the holding area. The washroom persons shall not enter this airlock or the work area until waste removal is finished for that period.

6. Containers and equipment shall be moved from the airlock and into the holding area by persons dressed in clean personal protective equipment, who have entered from uncontaminated areas.

7. The cleaned containers of asbestos material and equipment shall be placed in water tight carts with doors or tops that shall be closed and secured. These carts shall be held in the holding area pending removal. The carts shall be wet cleaned and/or HEPA vacuumed at least once each day.
8. The exit from the decontamination enclosure system shall be secured to prevent unauthorized entry.

9. Where the waste removal enclosure is part of the personnel decontamination enclosure,

waste removal shall not occur during shift changes or when otherwise occupied. Precautions shall be taken to prevent short circuiting and cycling of air outward through the shower and clean room.

10. Containers labeled with Asbestos hazard warnings shall not be used to dispose of non asbestos waste.

3.06 ENGINEERING CONTROLS

A. Ventilation.

1. The Abatement Contractor shall employ HEPA equipped vacuums or negative air pressure equipment for ventilation as required.

2. All negative air pressure equipment ventilation units shall be equipped with HEPA filtration. The Contractor shall provide a manufacturer's test certificate for each unit documenting the capability of trapping and retaining 99.97 percent of asbestos fibers greater than 0.3 microns equivalent aerodynamic diameter.

3. A power supply shall be available to satisfy the requirements of the total of all ventilating units.

4. On electric power failure, abatement shall stop immediately and shall not resume until power is restored and exhaust units are operating fully. On extended power failure, longer than one hour, the decontamination facilities, after the evacuation of all persons from the work area, shall be sealed airtight.

5. If extending the exhaust of the ventilation units 50 feet from the building would result in an exhaust location either in the road, blocking driveway access to the facility or within 50 feet of other buildings, a second unit will be run in series with the primary unit.

3.07 MAINTENANCE OF DECONTAMINATION ENCLOSURE SYSTEMS AND WORK AREA BARRIERS

A. GENERAL REQUIREMENTS

1. The Consultant must review and approve installation before commencement of work. Upon completion of the construction of all plastic barriers and decontamination system enclosures and prior to beginning actual abatement activities.
2. All plastic barriers inside the work area, in the personnel decontamination enclosure system, in the waste decontamination enclosure system and at partitions constructed to isolate the work area from occupied areas, shall be inspected by the asbestos supervisor at least twice daily. The barriers shall be inspected before the start of and following the completion of the day's abatement activities. Inspections and observations shall be

documented in the project log.

3. Damage and defects in the barriers and/or enclosure systems shall be repaired immediately upon discovery and prior to resumption of abatement activities.

4. At any time during the abatement activities, if visible emissions are observed outside of the work area of if damage occurs to the barriers, work shall be stopped, repairs made and visible residue immediately cleaned up using HEPA vacuuming methods prior to the resumption of abatement activities.

5. The Abatement Contractor shall HEPA vacuum and/or wet clean the waste decontamination enclosure system and the personnel decontamination enclosure system at the end of each day of abatement activities.

3.08 HANDLING AND REMOVAL PROCEDURES

The Abatement Contractor may utilize existing provisions of ICR-56, Applicable Variances or a Site Specific Variance, approved by the Owner's Consultant, to permit the conduct of this work.

3.09 ABATEMENT PROCEDURES

A. AIR SAMPLING - By Owner

1. Air sampling and analysis shall be conducted according to the requirements of Subpart 56-4 before the start, during and after the completion of the asbestos removal project.

2. In addition to the requirements of Subpart 56-4, air monitoring shall be conducted in accordance with any approved job specific variance(s) or applicable variance utilized.

3. Clearance samples may be analyzed using PCM to maintain compliance with ICR-56.

4. If applicable, clearance samples will be analyzed using TEM to maintain compliance with ICR-56 and 40 CFR 763.90[i].

B. The provisions of the Applicable Variances or a Job Specific Variance shall apply only in those areas where approval has been granted by the NYS DOL and the Contractor has obtained concurrence from the Owner's Consultant. All other applicable provisions of Industrial Code Rule 56-1 through 56-12 shall be complied.

C. A copy of the NYS DOL Job Specific or Applicable Variance, if applicable, shall be conspicuously posted at the work area(s).

D. The Abatement Contractor shall construct a decontamination unit at the work site. The

Abatement Contractor shall, as a minimum, comply with the requirements of 29 CFR 1926.1101(j); Hygiene facilities and practices for employees.

3.10 ENCAPSULATION PROCEDURES

The following procedures shall be followed to seal in non-visible residue, after obtaining satisfactory clearance air monitoring results, while conducting lockdown encapsulation on any surfaces which were the subject of removal or other remediation activities:

A. Only encapsulants rated as acceptable or marginally acceptable on the basis of Battelle Columbus Laboratory test procedures and rating requirements developed under the 1978 USEPA contract shall be used for lockdown encapsulation.

B. Sealants considered for use in encapsulation shall first be tested to ensure that the sealant is adequate for its intended use. A section of the work surface shall be evaluated following this initial test application of the sealant to quantitatively determine the sealant's effectiveness in terms of penetrating and locking down the asbestos fibers. The American Society of Testing and Materials (ASTM) Committee E06.21.06E on Encapsulation of Building Materials has developed a guidance document to assist in the selection of an encapsulant.

C. The encapsulant solvent or vehicle shall not contain a volatile hydrocarbon.

D. Encapsulants shall be applied using airless spray equipment.

1. Spraying is to occur at the lowest pressure range possible to minimize fiber release from encapsulant impact at the surface. It shall be applied with a consistent horizontal or vertical motion.

E. Encapsulation shall be utilized as a surface sealant once all asbestos containing materials have been removed in a work area. In no event shall encapsulant be applied to any surface that was the subject of removal or other remediation activities prior to obtaining satisfactory clearance air monitoring.

3.11 CLEANUP PROCEDURES

A. The following cleanup procedures shall be required.

1. Cleanup of accumulations of loose asbestos material shall be performed whenever enough loose asbestos materials have been removed to fill a single leak tight container of the type commensurate with the material properties. In no case shall cleanup be performed less than once prior to the close of each working day. Asbestos material shall be kept wet until cleaned up.

2. Accumulations of dust shall be cleaned off all surfaces on a daily basis using HEPA vacuum cleaning methods.

3. Decontamination enclosures shall be HEPA vacuumed at the end of each shift.

4. Accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pans, squeegees or shovels. Metal shovels shall not be used to pick up or move waste.

5. Excessive water accumulation or flooding in the area shall require work to stop until the water is collected and disposed of properly.

B. The following cleanup procedures shall be required after completion of all removal activities.

1. All accumulations of asbestos waste material shall be containerized utilizing HEPA vacuums or rubber or plastic dust pan, squeegees or shovels. Metal shovels shall not be used to pick up or move waste. HEPA vacuums shall be used to clean all surfaces after gross cleanup.

2. Cleaning. All surfaces in the work area shall be HEPA vacuumed. To pick up excess liquid and wet debris, a wet purpose shop vacuum may be used and shall be decontaminated prior to removal from the work area.

3. Windows, doors, HVAC system vents and all other openings shall remain sealed. Decontamination enclosure systems shall remain in place and be utilized.

4. All containerized waste shall be removed from the work area and the holding area.

5. All tools and equipment shall be decontaminated and removed from the work area.

6. A final visual inspection and clearance air monitoring, as per the schedule for air sampling and analysis, shall be conducted.

7. The isolation barriers and decontamination unit shall be removed only after satisfactory clearance air monitoring results have been achieved.

3.12 SAFETY MONITORING – CONSULTANT:

The Consultant will designate an Asbestos Safety Technician (AST) to represent the Owner during the removal program. The AST must be on the job site at all times during abatement work. Absolutely no abatement or preparation work will occur without the presence of the AST.

The AST will conduct four (4) milestone inspections.

1. Pre-commencement inspection shall be conducted as follows:

   a. Notification in writing to the Consultant shall be made by the Abatement Contractor to request a pre-commencement inspection at least 48 hours in advance of the desired date of inspection. This inspection shall be requested prior to beginning preparatory work in another work area.

   b. The AST shall ensure that:

      i. The job site is properly prepared and that all containment measures are in place;

      ii. The designated supervisor shall present to the inspector a valid supervisor's license issued by the New York Department of Labor;

      iii. All workers shall present to the inspector a valid handler's license issued by the New York Department of Labor;
      iv. Measures for the disposal of removed asbestos material are in place and shall conform to the adopted standards;

      v. The Abatement Contractor has a list of emergency telephone numbers at the job site which shall include the monitoring firm employed by the Owner and telephone numbers for fire, police, emergency squad, local hospital and health officer.

   c. If all is in order, the AST shall issue a written notice to proceed in the field. If the job site is not in order, then any needed corrective action must be taken before any work is to commence. Conditional approvals shall not be granted.

Progress inspection shall be conducted as follows:

   a. Primary responsibility for ensuring that the abatement work progresses in accordance with these technical specifications and regulatory requirements rests with the Abatement Contractor. The AST shall continuously be present to observe the progress of work and perform required tests.
   b. If the AST observes irregularities at any time, he shall direct such corrective action as may be necessary. If the Abatement Contractor fails to take the corrective action required, or if the Abatement Contractor or any of their employees habitually and/or excessively violate the requirements of any regulation, then the AST shall inform the Owner who shall issue a Stop Work Order to the Abatement Contractor and have the work site secured until all violations are abated.

Clean-up inspections shall be conducted as follows:

   a. Notice for clean-up inspection shall be requested by the Abatement Contractor at least 24 hours in advance of the desired date of inspection;

b. The clean-up inspection shall be conducted prior to the removal of any isolation or critical barriers and before final air clearance monitoring;

c. The AST shall ensure that:

i. The work site has been properly cleaned and is free of visible asbestos containing material and debris.

ii. All removed asbestos has been properly placed in a locked secure container outside of the work area.

d. If all is in order, the AST shall issue a written notice of authorization to remove surface barriers from the work area. All isolation barriers shall remain in place until satisfactory clearance air sampling has been completed.

4. Clearance Visual Inspection shall be conducted after the removal of non-critical plastic sheeting. The AST shall insure that:

a. The work area is free of all visible asbestos or suspect asbestos debris and residue.

b. All waste has been properly bagged and removed from the work area.

c. Should clearance visual inspection identify residual debris, as determined by the AST, the Abatement Contractor is responsible for recleaning the area at his own cost and shall bear all costs of reinspection until acceptable levels are achieved.

B. The Abatement Contractor shall be required to receive written approval before proceeding after each milestone inspection.

3.13 PERSONNEL AIR MONITORING – CONTRACTOR (29 CFR 1926.1101)

A. Personnel air monitoring shall be provided to determine both short-term (STEL) and full shift during when abatement activities occur. Personnel sampling shall be performed in each work area in order to accurately determine the concentrations of airborne asbestos to which workers may be exposed.

B. The Abatement Contractor shall have a qualified "Competent Person" (as specified in 29 CFR 1926 OSHA) to conduct personnel air monitoring.

C. The laboratory performing the air sample analysis shall be certified by NYS DOH ELAP and approved by the consultant.

D. Personnel air monitoring test results for OSHA Compliance. Results shall be posted at the work site within 24 hours of testing and copies supplied to the Owner within five (5) days

of testing. Abnormalities shall be supplied to the Owner immediately.

3.14 CLEARANCE AIR MONITORING

A. Air samples will be collected in and around the work areas at the completion of abatement activities.

B. Clearance samples may be analyzed using PCM to maintain compliance with ICR-56.

C. If applicable, clearance samples will be analyzed using TEM to maintain compliance with ICR-56 and 40 CFR part 763 "Asbestos-Containing Materials in Schools; Final Rule and Notice" section 763.90.

D. ***RETESTING***
Should clearance air monitoring yield fiber concentrations above the "Clearance" criteria of either 0.01 fibers per CC and/or background levels (PCM) –OR- seventy (70) structures per square millimeter (TEM/AHERA), the Abatement Contractor is responsible for re-cleaning the area at his own cost and shall bear all costs associated with the retesting of the work area(s) including monitoring labor, sampling, analysis, etc. until such levels are achieved.

3.15 RESPIRATORY PROTECTION REQUIREMENT

A. Respiratory protection shall be worn by all individuals inside the work area from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring in accordance with these specifications. The Abatement Contractor shall keep available at all times two PAPR's with new filters and charged batteries for use by authorized visitors.

B. All respiratory protection shall be MSHA/NIOSH approved in accordance with the provisions of 30 CFR Part II. All respiratory protection shall be provided by the Abatement Contractor, and used by workers in conjunction with the written respiratory protection program.

C. The Abatement Contractor shall provide respirators that meet the requirements of 29 CFR Parts 1910 and 1926.
1. Full facepiece Type C supplied-air respirators operated in pressure demand mode equipped with an auxiliary self- contained breathing apparatus, operated in pressure demand or continuous flow, shall be worn during gross removal, demolition, renovation and/or other disturbance of ACM whenever airborne fiber concentrations inside the work area are greater than 10.0 f/cc.

2. Full facepiece Type C supplied-air respirators operated in pressure demand mode with HEPA filter disconnect protection shall be work during gross removal, demolition, renovation and/or other disturbance of ACM with an amphibole content and/or

whenever airborne fiber concentrations inside the work area are equal to or greater than 0.5 f/cc and less than or equal to 10.0 f/cc.

3. Full facepiece powered air-purifying respirators (PAPR) equipped with HEPA filters shall be worn during the removal, encapsulation, enclosure, repair and/or other disturbance of friable ACM if airborne fiber concentrations inside the work area are less than 0.5 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow, with HEPA filter disconnect protection, may be substituted for a powered air-purifying respirator.

4. Loose fitting helmets or hoods with powered air-purifying respirators (PAPR) equipped with HEPA filters may be worn during the removal, encapsulation, enclosure, repair and/or other disturbance of friable ACM if airborne fiber concentrations inside the work area are less than 0.25 f/cc. A supply of charged replacement batteries, HEPA filters and flow test meter shall be available in the clean room for use with powered air-purifying respirators. HEPA filters shall be changed daily or as flow testing indicates change is necessary. Any Type C supplied-air respirator operated in continuous flow may be substituted for a powered air- purifying respirator.

5. Half-mask or full-face air-purifying respirators with HEPA filters shall be worn only during the preparation of the work area and final clean up procedures provided airborne fiber concentrations inside the work area are less than 0.1 f/cc.
6. Use of single use dust respirators is prohibited for the above respiratory protection.

D. Workers shall be provided with personally issued and individually marked respirators. Respirators shall not be marked with any equipment that will alter the fit of the respirator in any way. Only waterproof identification markers shall be used.

E. The Abatement Contractor shall ensure that the workers are qualitatively or quantitatively fit tested by an Industrial Hygienist initially and every six months thereafter with the type of respirator he/she will be using.

F. Whenever the respirator design permits, workers shall perform the positive and negative air pressure fit test each time a respirator is worn. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.
G. No facial hair, which interferes with the face-to-mask sealing surface, shall be permitted to be worn when wearing respiratory protection that requires a mask-to-face seal.

H. Contact lenses shall not be worn in conjunction with respiratory protection.

I. If a worker wears glasses, a spectacle kit to fit their respirator shall be provided by the

Abatement Contractor at the Abatement Contractor's expense.

J. Respiratory protection maintenance and decontamination procedures shall meet the following requirement:

1. Respiratory protection shall be inspected and decontaminated on a daily basis in accordance with OSHA 29 CFR 1910.134(b); and

2. HEPA filters for negative pressure respirators shall be changed after each shower; and

3. Respiratory protection shall be the last piece of worker protection equipment to be removed. Workers must wear respirators in the shower when going through decontamination procedures; and

4. Airline respirators with HEPA filtered disconnect shall be disconnected in the equipment room and worn into the shower. Powered air-purifying respirator facepieces shall be worn into the shower. Filtered/power pack assemblies shall be decontaminated in accordance with manufacturers' recommendations; and

5. Respirators shall be stored in a dry place and in such a manner that the facepiece and exhalation valves are not distorted; and

6. Organic solvents shall not be used for washing of respirators.

K. No visitors shall be allowed to enter the contaminated area if they do not have their medical certification and training certificate. Authorized visitors shall be provided with suitable PAPR respirators and instructions on the proper use of respirators whenever entering the work area.

3.16 DISPOSAL OF WASTE

A. APPLICABLE REGULATIONS

1. All asbestos waste shall be stored, transported and disposed of as per, but not limited to, the following Regulations:

a. NYS Code Rule 56
b. U.S. Department of Transportation (DOT)
Hazardous Substances
Title 29, Part 171 and 172 of the code of Federal Regulations
regarding waste collector registration

c. Regulations regarding waste collector registration Title 6, part 364 of the New York State Official Compilation of Codes, Rules and Regulations – 6 NYCRR 364

d. USEPA NESHAPS 40 CRF 61

e. USEPA ASBESTOS WASTE MANAGEMENT GUIDANCE EPA/530-SW-85-007

B. TRANSPORTER OR HAULER - The Abatement Contractor shall bear full responsibility for proper characterization, transportation and disposal of all solid or liquid waste, generated during the project, in a legal manner. The Owner shall approve all transportation and disposal methods.

1. The Abatement Contractor's Transporter (hauler) and disposal site shall be approved by the Owner. The Abatement Contractor shall remove within 48 hours all asbestos waste from the site after completing the clean up.

2. The Transporter must possess and present to the Owner's representative a valid New York State Department of Environmental Conservation Part 364 asbestos hauler's permit to verify license plate and permit numbers. The Owner's representative will verify the authenticity of the hauler's permit with the proper authority.

3. The Abatement Contractor shall give 24 hour notification prior to removing any waste from the site. All waste shall be removed from site only during normal working hours. No waste may be taken from the site without authorization from the Owner's representative.

4. The Abatement Contractor shall have the Transporter give the date and time of arrival at the disposal site.

5. The Transporter with the Abatement Contractor and Owner's consultant shall inspect all material in the transport container prior to taking possession and signing the Waste Manifest. The Transporter shall not have any off site transfers or be combined with any other off-site asbestos material.

6. The Transporter must travel directly to the disposal site with no unauthorized stops.

C. WASTE STORAGE CONTAINER

1. During loading and on site storage, the asbestos waste container shall be labeled with EPA Danger signage:

DANGER CONTAINS ASBESTOS FIBERS AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD

2. The NYS DEC Hauler's Permit number shall be on both sides and back of the container.

3. The Container will not be permitted to leave the site without the proper signage.

4. A copy of the completed waste manifest shall be forwarded directly to the Owner's Consultant by the disposal facility.

5. Packaging of Non-friable Asbestos. Use of an open top container shall require written request, by the Contractor, and written approval by the Owners Representative, and be performed in compliance with all applicable regulations.

   a) A chute, if used, shall be air/dust tight along its lateral perimeter and at the terminal connection to the dumpster at ground level (solid wall and top container). The upper end of the chute shall be furnished with a hinged lid, to be closed when the chute is not being used.

   b) The container shall be lined with a minimum of two (2) layers of 6 mil. Fire-retardant polyethylene draped loosely over the sides so as to facilitate being wrapped over the top of the load and sealed prior to transport from the site.

   c) Prior to transport from the work site the Dumpster will be disconnected from the chute and sealed air/dust tight utilizing six mil plastic and tape. The waste material will be transported as an asbestos containing material by appropriate legal methods.

6. Packaging Friable Asbestos.
   a) The container shall be a solid wall, hard top and lockable container.

   b) The container shall be locked upon arrival at the site to restrict access. Security shall be provided at the entrance to the container during the loading process and immediately locked upon completion.

   c) The interior walls, floor and ceiling shall be lined with two (2) layers of 6 mil. Fire-retardant polyethylene.

   d) The waste shall be loaded in such a manner as to protect the integrity of the individual waste packages.

   e) Prior to transport from the work site the interior of the Dumpster will sealed air/dust tight utilizing six mil plastic and tape. The waste material will be transported as an asbestos containing material by appropriate legal methods.

D. WASTE DISPOSAL MANIFEST

1. The Asbestos Waste Manifest shall be equivalent to the "Waste Shipment Record"

included in 40 CFR 61. A copy of the Contractor's manifest shall be reviewed by the Owner's Consultant and shall be the only manifest used.

2. The Manifest shall be verified by the Owner's Consultant indicating that all the information and amounts are accurate and the proper signatures are in place.

3. The Manifest shall have the signatures of the Abatement Contractor and the Transporter prior to any waste being removed from the site.
4. The Manifest shall be signed by the Disposal Facility owner or operator to certify receipt of asbestos containing materials covered by the manifest.

5. A copy of the completed manifest shall be provided by the Abatement Contractor to the Owner's Consultant and remain on site for inspection.

6. Abatement Contractor shall maintain a waste disposal log which indicates load number, date and time left site, container size, type of waste, quantity of waste, name of hauler, NYS DES permit number, trailer and tractor license number, and date manifest was returned to Consultant.

7. The Disposal Facility owner or operator shall return a signed copy of the Waste Manifest directly to:

   WASHINGTONVILLE CENTRAL SCHOOL DISTRICT
   52 WEST MAIN STREET
   WASHINGTONVILLE, NY 10992
   ATTN: JACK RALLO

8. Copies of the completed Waste Manifest are to be sent by the disposal facility to the Hauler and Abatement Contractor.

9. Submit signed dump tickets and manifests with final payment request.

10. Final payment request will not be honored without signed dump ticket or manifests accounting for all asbestos waste removed from the site.

E. VIOLATIONS OF SPECIFICATIONS

1. Violations of the safety, hygiene, environmental, procedures herein, any applicable federal, state of local requirements or failure to cooperate with the Owner's representative shall be grounds for dismissal and/or termination of this contract.

F. VIOLATIONS OF NO SMOKING POLICY

1. The Federal Pro Children Act of 1994 prohibits School District Officials from smoking in any buildings or on the grounds that is property of the School District. The District shall be considered smoke free. The School District strongly enforces its' No Smoking Policy. It is the Contractor's responsibility to inform all workers of this policy. Any worker(s) involved with this project that are found smoking or using tobacco products will be informed that they are in violation of the Federal and State Law and School Board Policy and will be removed from site.

3.17 LOCATION OF WORK – BASE BID

(Please see attached Drawings for approximate locations)

Washingtonville Central School District – 2024 Capital Improvement Project – Phase 3

Washingtonville Middle School

- Asbestos Abatement Contractor responsible for complete and total removal and disposal of approximately 800 SF of Non-Friable Asbestos-containing Floor Tile & Mastic/Adhesive to non-ACM substrate below. Asbestos Abatement Contractor is responsible for providing all demolition activities required to access materials, as well as for providing all labor, equipment, and materials necessary. The spaces included in this scope of work include:

    - Kitchen Office (K105) – 50 SF
    - Kitchen (K101), Southwest Half of Room – 750 SF[1]

- Asbestos Abatement Contractor responsible for complete and total removal and disposal of approximately 500 SF of Presumed Asbestos-containing wall and ceiling insulation throughout kitchen walk-in coolers/freezers (Rooms K108 and K109)[1]. Asbestos Abatement Contractor is responsible for providing all demolition activities required to access materials, as well as for providing all labor, equipment, and materials necessary.

    1) Note: ACM Floor Tile and Mastic in Kitchen assumed to exist below top layer of non-ACM quarry tile flooring system, on bottom layer of non-ACM quarry tile flooring system. Presence of ACM Tile and Mastic could not be confirmed due to non-destructive testing methods. Presence of PACM cooler/freezer insulation similarly could not be confirmed due to the coolers/freezers being actie at the time of inspection. Recommend destructive probing by a NYSDOL licensed asbestos inspector prior to construction.

Washingtonville High School

- No required Asbestos Abatement anticipated in relation to the Phase 3 scope of work.

END OF WORK LOCATIONS

3.18 GENERAL

A. The Abatement Contractor will be responsible for repairing all building components damaged during abatement including, but not limited to: ceiling tiles, ceiling finishes, wall finishes, floor finishes, etc.

B. The Abatement Contractor shall be responsible for all demolition required to access materials identified in scope of work and on associated drawings.
C. Concealed conditions that are exposed and may require additional work shall be brought to the attention of the Owner immediately. The Abatement Contractor shall not abate these areas without a written notice to proceed. Additional asbestos abatement performed prior to the order to proceed will not be acknowledged.

D. The Abatement Contractor shall remove asbestos-containing floor covering to the building substrate beneath; in areas indicted. Subsequent to final air clearance the substrate shall be washed with a neutralizing agent to prepare the substrate to accept new floor covering and eliminate residual odors.

E. Power tools used to drill, cut into or otherwise disturb asbestos containing material shall be equipped with HEPA filtered local exhaust ventilation.

F. The Abatement Contractor shall provide access to GFCI electrical power, required to perform the area air monitoring for this project, within and immediately adjacent to each work area.

G. Unwrapped or unbagged ACM shall be immediately placed in an impermeable waste bag or wrapped in plastic sheeting.

H. Coordinate all removal operations with the Owner.

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

Asbestos Employee Medical Examination Statement

Certificate of Worker Release

Asbestos Employee Training Statement

CERTIFICATE OF WORKERS'S ACKNOWLEDGEMENT

PROJECT NAME: 2024 Capital Improvements Project – Phase 3

ABATEMENT CONTRACTOR'S NAME:_____

WORKING WITH ASBESTOS INVOLVES POTENTIAL EXPOSURE TO AIRBORNE ASBESTOS FIBERS. INHALING ASBESTOS FIBERS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCER AND RESPIRATORY DISEASES. SMOKING CIGARETTES AND INHALATION OF ASBESTOS FIBERS INCREASES THE RISK THAT YOU WILL DEVELOP LUNG CANCER ABOVE THAT OF THE NON-SMOKING PUBLIC.

The Contract for this project requires the Abatement Contracting Company to: 1) supply proper respiratory protection devices, and training on their use, to their employees; 2) provide training on safe work practices, and on use of the equipment used on the project, to their employees; and, 3) provide annual medical examinations to their employees meeting the requirements of 29 CFR 1926.1101. The Abatement Contracting Company's signature on this certificate, documents that these contractual obligations are fulfilled, and that you understand the information presented to you.

**********DO NOT SIGN THIS FORM UNLESS YOU FULLY UNDERSTAND THIS INFORMATION**********

RESPIRATORY PROTECTION: I have been trained in the proper use and limitations of the type of respiratory protection devices to be used on this project. I have reviewed the written respiratory protection program manual and a copy is available for my use. Respiratory protection equipment has been proved, by the Contractor, at no cost to me.

TRAINING COURSE: I have been trained in the risks and dangers associated with handling asbestos, breathing asbestos dust, proper work procedures, personal protection and engineering controls. I have satisfactorily completed and Asbestos Safety Training Program for New York State and have been issued a New York State Department of Health Certificate of Asbestos Safety Training.

MEDICAL EXAMINATION: I have satisfactorily completed a medical examination within the last 12 months that meets the OSHA requirement for an asbestos worker and included at least 1) medical history 2) pulmonary function 3) medical examination 4) approval to wear respiratory protection devises and may have included an evaluation of a chest x-ray.

Signature:_____ Printed Name: _____
Date:_____

Witness Signature:_____ Printed Name: _____
Date:_____

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

ESTIMATE OF ACM QUANTITIES

PROJECT NAME: 2024 Capital Improvements Project – Phase 3

****

EACH ABATEMENT CONTRACTOR SHALL READ AND ACKNOWLEDGE THE FOLLOWING NOTICE. A SIGNED AND DATED COPY OF THIS ACKNOWLEDGMENT SHALL BE SUBMITTED WITH THE ABATEMENT CONTRACTOR'S BID FOR THIS PROJECT. FAILURE TO DO SO MAY, AT THE SOLE DISCRETION OF THE OWNER, RESULT IN THE BID BEING CONSIDERED NON-RESPONSIVE AND RESULT IN DISQUALIFICATION OF THE ABATEMENT CONTRACTOR'S BID ON THIS PROJECT.

****

*** NOTICE ***

The linear and square footages listed within this specification are approximates. Abatement Contractor is required to visit the work locations prior to bid submittal in order to take actual field measurements within each listed location. The Abatement Contractor shall base their bid on actual quantities determined, by them, at the site walkthrough. Estimates provided in these specifications are for informational purposes only and shall not be considered a basis for Change Orders on this project.

****

Acknowledgment: I have read and understand the above NOTICE regarding removal quantity estimates and understand that estimates provided in these specifications are for informational purposes only and shall not be considered a basis for Change Orders on this project. The Abatement Contractor's signatory represents to the Owner that he/she has the authority of the entity he/she represents to sign this agreement on its behalf.

Company Name: _____
Type or Print

BY: _____ _____ _____
Signature Title Date

Print Name: _____

RETURN THIS EXECUTED FORM WITH COMPLETED BID SHEET

ASSOCIATED ASBESTOS REMOVAL LOCATION DRAWINGS

- 2024 Capital Improvements Project – Phase 3 – Washingtonville CSD – Washingtonville Middle School – ASB-100 (1st Floor Removal Locations)

END OF SECTION 028200

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SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.2 RELATED REQUIREMENTS

A. Section 032000 - Concrete Reinforcing.

B. Section 033000 - Cast-in-Place Concrete.

C. Section 051200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.3 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

B. ACI PRC-347 - Guide to Formwork for Concrete; 2014 (Reapproved 2021).

C. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

D. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

E. ASME A17.1 - Safety Code for Elevators and Escalators Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices; 2022.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on void form materials and installation requirements.

C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

1.5 QUALITY ASSURANCE

A. Perform work of this section in accordance with relevant portions of ACI 347R, ACI 301, and ACI 318.

PART 2 PRODUCTS

2.1 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Chamfer outside corners of beams, joists, columns, and walls.

D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

E. Comply with relevant portions of ACI CODE-318, ACI PRC-347, and ACI SPEC-301.

F. Use the following form types:
1. Foundation Walls: Site fabricated plywood.
2. Foundation Walls Exposed To View: Site fabricated rough sawn lumber.

2.2 WOOD FORM MATERIALS

A. All other concrete:
1. Plywood: Douglas Fir species; solid one side grade; sound undamaged sheets with clean, true edges.
2. Provide forms to suit final installed concrete finish.

B. Form Support Lumber: SPF, SYP or Hem Fir species; No. 2 grade; with grade stamp clearly visible.

2.3 FORMWORK ACCESSORIES

A. Form Ties: Removable type, galvanized metal, fixed length, cone type, 3/4" break-back dimension, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

C. Dovetail Anchor Slot: Galvanized steel, at least 22 gauge, 0.0299 inch thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork. Provide _____ manufactured by _____.

D. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 051200.

E. Waterstops: Bentonite and butyl rubber.
1. Configuration: As indicated on drawings.
2. Size: As indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Earth forms are permitted for footing excavations only.

B. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Obtain approval before framing openings in structural members that are not indicated on drawings.

D. Coordinate this section with other sections of work that require attachment of components to formwork.

E. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 042613.

E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

F. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.

G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.
   1. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI SPEC-117, unless otherwise indicated.

B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

3.8 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.9 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Mass Concrete: Concrete maturity shall be measured in accordance with methods established/required in ACI 301. Do not removed forms until concrete has reached appropriate maturity and thermal levels. Keep formwork in place as long as practicable to aid in moisture retention.

C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

D. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION 031000

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SECTION 032000 - CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.2 RELATED REQUIREMENTS

A. Section 031000 - Concrete Forming and Accessories.

B. Section 033000 - Cast-in-Place Concrete.

C. Section 316329 - Drilled Concrete Piers and Shafts: Reinforcement for drilled pier foundations.

1.3 REFERENCE STANDARDS

A. ACI MNL-66 - ACI Detailing Manual; 2020.

B. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.

D. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2022a.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.

F. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.

G. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).

H. CRSI (DA4) - Manual of Standard Practice; 2024.

I. CRSI (P1) - Placing Reinforcing Bars, 10th Edition; 2019.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI MNL-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

E. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.5 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301.
   1. Maintain one copy of each document on project site.

B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.4/D1.4M and no more than 12 months before start of scheduled welding work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 60,000 psi, deformed steel bars.
   1. Plain billet-steel bars.
   2. Unfinished.

B. Weldable Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.
   1. Unfinished.

C. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
   1. Form: Flat Sheets.

D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.2 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4)- Manual of Standard Practice.

B. Welding of reinforcement is permitted only as indicated on the contract drawings. Perform welding in accordance with AWS D1.4/D1.4M.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.
   1. Review locations of splices with Structural Engineer.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as indicated on the contract drawings.

E. Bond and ground all reinforcement to requirements of Section 260526.

3.2 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 45 33 - Code-Required Special Inspections, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION 032000

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SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete foundation walls, slab-on-grade and Drilled Piers.

B. Joint devices associated with concrete work.

C. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrust blocks, and manholes.

D. Concrete curing.

1.2 RELATED REQUIREMENTS

A. Section 031000 - Concrete Forming and Accessories: Forms and accessories for formwork.

B. Section 032000 - Concrete Reinforcing.

C. Section 079200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

D. Section 079513 - Expansion Joint Cover Assemblies.

1.3 REFERENCE STANDARDS

A. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; 1998 (Reapproved 2004).

B. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).

C. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.

D. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.

E. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

F. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.

G. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.

H. ACI PRC-308 - Guide to External Curing of Concrete; 2016.

I. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

J. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2023.

L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2024.

M. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2023.

N. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.

O. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.

P. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.

Q. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2023.

R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

S. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2023.

T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision (2022).

U. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.

V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.

W. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

X. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2022.

Y. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types); 2023.

Z. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers; 2020.

AA. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.

BB. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs; 2017.

CC. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric); 2014.

1.4 PREINSTALLATION MEETING

A. Preinstallation Conference: Conduct conference at Project Site.

B. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
1. Contractor's superintendent.
2. Independent testing agency responsible for concrete design mixtures.
3. Ready-mix concrete manufacturer.
4. Concrete Subcontractor.
5. Retain first subparagraph below if special concrete finishes are included in Project.
6. Special concrete finish Subcontractor.
7. Structural Engineer

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

C. Mix Design: Submit proposed concrete mix design.
1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.
2. Indicated amounts of mixing water to be witheld for later addition at Project Site.

D. Material Test Reports: For the following, from a qualified testing agency:
1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

E. Test Reports: Submit report for each test or series of tests specified.

F. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
   1. Location of construction joints is subject to approval of the Structural Engineer.

G. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

H. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.

D. Follow recommendations of ACI 207.1R when placing Mass Concrete.

E. Follow recommendations of ACI PRC-305 when concreting during hot weather.

F. Follow recommendations of ACI PRC-306 when concreting during cold weather.

G. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

1.7 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Slabs with Porosity Inhibiting Admixture (PIA) or Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.
   1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.

2. Provide warranty by admixture manufacturer matching terms of flooring adhesive or primer manufacturer's material defect warranty.

1.8 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Concrete Subcontractor.
      e. Special Inspection and Testing Agency
      f. Special concrete finish Subcontractor.
      g. Structural Engineer
   2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, methods for achieving specified floor and slab flatness and levelness concrete repair procedures, and concrete protection.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 degrees Fahrenheit for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows:
   1. Maintain concrete temperature below 90 degrees Fahrenheit at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 PRODUCTS

2.1 FORMWORK

A. Comply with requirements of Section 031000.

2.2 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 032000.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
   1. Acquire cement for entire project from same source.

B. Fine and Coarse Normal-Weight Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.
   2. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
   3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Fly Ash: ASTM C618, Class F.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.4 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Accelerating Admixture: ASTM C494/C494M Type C.

H. Retarding Admixture: ASTM C494/C494M Type B.

I. Water Reducing Admixture: ASTM C494/C494M Type A.

2.5 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with {rs#1}, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
   1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
   2. Installation: Comply with ASTM E1643.
      a. Single layer, 15 mil minimum.
   3. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
   4. Products:
      a. Stego Industries, LLC; ____: www.stegoindustries.com/#sle.
      b. W. R. Meadows, Inc; PERMINATOR Class A - 15 mils 0.01 inch: www.wrmeadows.com/#sle.

B. Non-Shrink Cementitious Grout: Premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agents.
   1. Grout: Comply with ASTM C1107/C1107M.
   2. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.
   3. Products containing aluminum powder are not permitted.
   4. Flowable Products:
      a. Five Star Products, Inc; Five Star Fluid Grout 100: www.fivestarproducts.com/#sle.
      b. W. R. Meadows, Inc; CG-86: www.wrmeadows.com/#sle.
      c. Substitutions: See Section 016000 - Product Requirements.

2.6 BONDING AND JOINTING PRODUCTS

A. Epoxy Bonding System:
   1. Complying with ASTM C881/C881M and of Type required for specific application.

B. Waterstops: Self-expanding rubber strip or butyl strip; swells to 1000 percent of original size in clean water. Size 3/4 by 1 inch, minimum.

C. Slab Isolation Joint Filler: 1/2-inch thick, height equal to slab thickness, with removable top section forming 1/2-inch deep sealant pocket after removal.
   1. Material: ASTM D1751, cellulose fiber.

D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

2.7 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Sheet: ASTM C171.
   1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
   2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

D. Water: Potable, not detrimental to concrete.

2.8 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.

B. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.

C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

D. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.

E. Normal Weight Concrete:
   1. Pool Deck, Locker Room Slab, Starter Anchorage Block:
      a. Minimum Compressive Strength: 5000 psi at 28 days.
      b. Maximum W/C Ratio: 0.40.
      c. Slump Limit: 4 inches, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

2.9 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

A. Install temperature gauges and thermal monitoring devices in accordance with Contractor's thermal control plan.

B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

C. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

E. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI SPEC-301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.4 PLACING CONCRETE

A. Place concrete in accordance with ACI PRC-304.

B. Place concrete for floor slabs in accordance with ACI PRC-302.1.

C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

D. Monitor thermal/temperature of mass concrete in accordance with ACI 301.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.5 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
   1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

D. Saw Cut Contraction/Control Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.6 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. An independent testing agency, as specified in Section 014000, will inspect finished slabs for compliance with specified tolerances.

B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
   1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.

2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
3. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.

C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.

D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.

E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.7 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Comply with requirements listed in ACI 301 and 117.

C. Exposed Form Finish: Comply with requirements listed in ACI 301 and 117.
1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

D. Concrete Slabs: Finish to requirements of ACI PRC-302.1 and as follows:
1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in {\rs\#1}; thick floor coverings include quarry tile and ceramic tile with full bed setting system.
2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in {\rs\#1}; thin floor coverings include carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.
3. Other Surfaces to Be Left Exposed: Trowel as described in ACI PRC-302.1, minimizing burnish marks and other appearance defects.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.8 CURING AND PROTECTION

A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than seven days.
2. High early strength concrete: Not less than four days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   a. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
3. Final Curing: Begin after initial curing but before surface is dry.
   a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.9 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure Five concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed per day.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.10 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.11 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION 033000

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SECTION 042000 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete block.

B. Concrete facing brick.

C. Decorative concrete masonry units.

D. Mortar and Grout.

E. Reinforcement and anchorage.

F. Flashings.

G. Lintels.

H. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories: Dovetail slots for masonry anchors.

B. Section 03 20 00 - Concrete Reinforcing: Reinforcing steel for grouted masonry.

C. Section 03 30 00 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.

1.3 REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.

C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.

D. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2022.

E. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units 2017.

F. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.

G. ASTM C150/C150M - Standard Specification for Portland Cement 2022.

H. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.

I. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale) 2022.

J. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.

K. ASTM C387/C387M - Standard Specification for Packaged, Dry, Combined Materials for Concrete and High Strength Mortar 2017.

L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.

M. ASTM C476 - Standard Specification for Grout for Masonry 2022.

N. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.

O. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength 2019.

P. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar 1992a (Reapproved 2014).

Q. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms 2022.

R. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry 2019a.

S. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015, with Editorial Revision (2022).

T. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry 2020.

U. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.

V. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls 2005.

W. BIA Technical Notes No. 46 - Maintenance of Brick Masonry 2017.

X. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.5 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
   1. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.

C. Shop Drawings: For the following:
   1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
   2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
   3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
   4. Samples: Submit two samples of decorative block and colored mortar to illustrate color, texture, and extremes of color range.

D. Samples for Initial Selection:
   1. Decorative CMUs, in the form of small-scale units.
   2. Colored mortar.

E. Samples for Verification: For each type and color of the following:
   1. Exposed Decorative CMUs.
   2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

F. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

G. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.

1.6 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.7 MOCK-UP

1. onstruct a masonry wall as a mock-up panel sized 4 feet long by 4 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
2. Locate where directed.
3. Mock-up may remain as part of the Work.

B. 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 for typical exterior and interior walls in sizes approximately 48 inches long by 36 inches high by full thickness, including face and backup wythes and accessories.
a. Include a sealant-filled joint at least 16 inches long in each mockup.
b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
2. Protect accepted mockups from the elements with weather-resistant membrane.
3. 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.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. 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.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

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.

1.9 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 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.

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

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do no use units where such defects are exposed in the completed work.

B. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

2.2 CONCRETE MASONRY UNITS

A. Concrete Block - Standard: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.
   2. Load-Bearing Units: ASTM C90, normal weight.
      a. Hollow block, as indicated.
      b. Normalweight
   3. Non-Loadbearing Units: ASTM C129.
      a. Hollow block, as indicated.
      b. Lightweight.

4. Units with Integral Water Repellent: Concrete block units as specified in this section with polymeric liquid admixture added to concrete masonry units at the time of manufacture.
    a. Performance of Units with Integral Water Repellent:
        1) Water Permeance: When tested per ASTM E514/E514M and for a minimum of 72 hours.
            a) No water visible on back of wall above flashing at the end of 24 hours.
            b) No flow of water from flashing equal to or greater than 0.032 gallons per hour at the end of 24 hours.
            c) No more than 25 percent of wall area above flashing visibly damp at end of test.
        2) Flexural Bond Strength: ASTM C1072; minimum 10 percent increase.
        3) Compressive Strength: ASTM C1314; maximum 5 percent decrease.
        4) Drying Shrinkage: ASTM C1148; maximum 5 percent increase in shrinkage.
    b. Use only in combination with mortar that also has integral water repellent admixture.
    c. Use water repellent admixtures for masonry units and mortar by a single manufacturer.
    d. Exposed Faces: Color and texture to be selected from manufacturer's full range.
    e. Products:
        1) Substitutions: See Section 01 60 00 - Product Requirements.

2.3 Decorative cmu (EXTERIOR WALL APPLICATIONS)

1. Basis of Design Product: Subject to compliance with requirements, provide Standard Lightweight CMUs with Ground-Face Finish manufactured by Westbrook Concrete Block Company, Inc. or a comparable product by one of the following:
    a. Echelon Masonry.
    b. Jandris Block.
    c. Nitterhouse Masonry Products, LLC
    d. RCP Block and Brick, Inc.
2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
3. Density Classification: Lightweight
4. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions, as indicated in drawings.
5. Pattern and Texture: Standard pattern, ground-face finish
6. Colors: As selected by Architect from manufacturer's full range.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
   1. Not more than 0.60 percent alkali.

B. Hydrated Lime: ASTM C207, Type S.

C. Mortar Aggregate: ASTM C144.

D. Grout Aggregate: ASTM C404.

E. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
   1. Color(s): As selected by Architect from manufacturer's full range.

F. Water: Clean and potable.

G. Accelerating Admixture: Nonchloride type for use in cold weather.

H. Integral Water Repellent Admixture for Mortar: Polymeric liquid admixture added to mortar at the time of manufacture.
   1. Use only in combination with masonry units manufactured with integral water repellent admixture.
   2. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
   3. Meet or exceed performance specified for water repellent admixture used in masonry units.

I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494 / C494M, Type C, and as recomended by manufacturer for use in masonry mortar of composition indicated.

J. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
   1. Type: Types as scheduled in this section.
   2. Color: Mineral pigments added as required to produce approved color sample.
   3. Water-repellent mortar for use with water repellent masonry units.

K. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

2.5 REINFORCEMENT AND ANCHORAGE

A. Reinforcing Steel: ASTM A615, Grade 60 (60,000 psi), deformed billet bars; uncoated.

B. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

C. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not less than 5/8 inch of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in.

D. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
   2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
   3. Vertical adjustment: Not less than 3-1/2 inches.

E. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws; corrosion resistant finish or hot dip galvanized to ASTM A153/A153M.

2.6 FLASHINGS

A. Metal Flashing: Provide metal flashing complying with Section 076200 "Sheet Metal Flashing and Trim".

B. EPDM Flashing: ASTM D4637/D4637M, Type I, 0.040 inch thick.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc: www.h-b.com/#sle.

C. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.

D. Application: Unless otherwise indicated, use the following:
   1. Where flashing is indicated to receive counterflashing, use metal flashing.
   2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
   3. Where flashing is party exposed and is indicated to terminate at the wall face, use metal flashing or flexible flashing with a metal drip edge.
   4. Where flashing is fully concealed, use metal flashing or flexible flashing.

2.7 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Blok-Lok Limited: www.blok-lok.com.
      b. Hohmann & Barnard, Inc: www.h-b.com/sle.
      c. WIRE-BOND: www.wirebond.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc: www.h-b.com/sle.
      b. WIRE-BOND: www.wirebond.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.

D. Weeps:
   1. Type: Polyester mesh.
   2. Color(s): As selected by Architect from manufacturer's full range.

E. Cavity Vents:
   1. Type: Polyester mesh.
   2. Color(s): As selected by Architect from manufacturer's full range.

F. Multicomponent Cavity Wall Drainage System: Combination mortar diverter, flashing and weep system.
   1. Drip Edge: Stainless steel.
   2. Termination Bar: Stainless steel.
   3. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.8 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Masonry below grade and in contact with earth: Type M.
   2. Exterior, loadbearing masonry: Type S.
   3. Exterior, non-loadbearing masonry: Type S.
   4. Interior, loadbearing masonry: Type N.
   5. Interior, non-loadbearing masonry: Type O.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

D. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

E. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.

3. Mortar Joints: Concave.

3.5 PLACING AND BONDING

A. Lay hollow masonry units with face shell bedding on head and bed joints.

B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

C. Remove excess mortar and mortar smears as work progresses.

D. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.6 WEEPS/CAVITY VENTS

A. Install weeps in veneer walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

B. Install cavity vents in veneer and cavity walls at 24 inches on center horizontally below shelf angles and lintels and near top of walls.

3.7 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.8 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, and CAVITY WALL MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.9 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend plastic, laminated, and EPDM flashings to within 1/4 inch of exterior face of masonry.

C. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.11 LINTELS

A. Install reinforced unit masonry lintels, as scheduled.
   1. Do not splice reinforcing bars.
   2. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
   3. Place and consolidate grout fill without displacing reinforcing.
   4. Allow masonry lintels to attain specified strength before removing temporary supports.

3.12 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.

3.13 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and anchor bolts and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.
1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.14 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

3.15 CUTTING AND FITTING

A. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.16 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.

3.17 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.18 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION 042000

SECTION 042613 - MASONRY VENEER

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Clay face brick.
   2. Concrete face brick.
   3. Mortar.
   4. Ties and anchors.
   5. Embedded flashing.
   6. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:
   1. Steel lintels in masonry veneer.
   2. Steel shelf angles for supporting masonry veneer.

C. Related Requirements:
   1. Section 033000 "Cast-in-Place Concrete" for installing of masonry-veneer anchors.
   2. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 PERFORMANCE REQUIREMENTS

A. Provide structural masonry that develops indicated net-area compressive strengths (f'm) at 28 days.

B. Determine net-area compressive strength (f'm) of masonry by testing masonry prisms according to ASTM C 1314.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:
   1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
   2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:
   1. Clay face brick.
   2. Concrete face brick, in the form of small-scale units.
   3. Colored mortar.
   4. Weep holes/vents.

D. Samples for Verification: For each type and color of the following:
   1. Clay face brick.
   2. Special brick shapes.
   3. Concrete face brick.
   4. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.
   5. Weep holes/vents.
   6. Accessories embedded in masonry.

1.7 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
   1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Material Certificates: For each type and size of the following:
   1. Masonry units.
      a. Include material test reports substantiating compliance with requirements.
      b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
      c. For exposed brick, include test report for efflorescence according to ASTM C 67.

d. For surface-coated brick, include test report for durability of surface appearance after 50 cycles of freezing and thawing according to ASTM C 67.

2. Integral water repellant used in decorative CMUs.
3. Cementitious materials. Include name of manufacturer, brand name, and type.
4. Mortar admixtures.
5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
6. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.

D. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.8 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.
1. Build mockups for each type of exposed masonry construction in sizes approximately 48 inches long by 48 inches high by full thickness, including face and backup wythes and accessories.
a. Include a sealant-filled joint at least 16 inches long in each mockup.
b. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12 inch length of flashing left exposed to view (omit masonry above half of flashing).
c. Include weather-resistive barriers, veneer anchors, flashings, cavity drainage materials, and weep holes in exterior masonry-veneer wall mockup as required for each type of exposed masonry construction.
2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
3. Protect accepted mockups from the elements with weather-resistant membrane.
4. 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.

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

1.9 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.

1.10 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of veneer, 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 down face of veneer, and hold cover securely in place.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry. Immediately remove grout, mortar, and soil that come in contact with 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.

C. 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 and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

D. 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 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 will be exposed in the completed Work.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

2.3 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
   1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
   2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.

3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C 216
1. Grade: SW
2. Type: FBS or HBS
3. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C 67.
4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet.
6. Size (Actual Dimensions): Match Existing. Provide clay face brick matching color range, texture, and size of existing adjacent brickwork.

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.

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 E 514/E 514M 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.

C. Concrete Face Brick: ASTM C1634.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Glen-Gery Brick, or a comparable product by one of the following:
a. Bowerston Ohio Quality Brick
b. Brampton Brick
c. Hebron Brick Company
d. Meridian Brick
e. Yankee Hill Brick
f. York Building Products
2. Density Classification: Normal weight.

3. Size: Modular.
4. Actual Dimensions: 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
5. Texture: Ground-face finish
6. Colors: As selected by Architect from manufacturer's full range.

2.5 MORTAR MATERIALS

A. Portland Cement: ASTM C 150/C 150M, 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 C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C 91/C 91M.

E. Mortar Cement: ASTM C 1329/C 1329M.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.

G. 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:
   2. Colored Masonry Cement:
   3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
   4. Pigments shall not exceed 10 percent of Portland cement by weight.
   5. Pigments shall not exceed 5 percent of cement by weight.

H. Aggregate for Mortar: ASTM C 144.
   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 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.

I. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

K. Water: Potable.

2.6 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch 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 A 82/A 82M, with ASTM A 641/A 641M, Class 1 coating.
2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
3. Galvanized-Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.
4. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.

C. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060 inch thick, steel sheet, galvanized after fabrication.

D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.
2. Tie Section: Triangular-shaped wire tie made from 0.25 inch diameter, hot-dip galvanized steel. Mill-galvanized wire may be used at interior walls unless otherwise indicated.

E. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.105 inch thick steel sheet, galvanized after fabrication.

a. 4 inch thick galvanized-steel sheet may be used at interior walls unless otherwise indicated.

2. Tie Section: Triangular-shaped wire tie made from 0.25 inch diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.
3. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060 inch thick, steel sheet, galvanized after fabrication, with dovetail tabs for inserting into dovetail slots in concrete.
    a. 4 inch thick galvanized-steel sheet may be used at interior walls unless otherwise indicated.

F. Adjustable Masonry-Veneer Anchors:
1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf (445-N) load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.105 inch thick steel sheet, galvanized after fabrication
3. Fabricate wire ties from 0.25 inch diameter, hot-dip galvanized-steel wire unless otherwise indicated.
4. Fabricate wire connector sections from 0.25 inch diameter, hot-dip galvanized-steel wire.
5. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
6. Screw-Attached, Masonry-Veneer Anchors:
    a. Wire tie and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for inserting wire tie. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs.
    b. Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed washer head that covers hole in sheathing.
    c. Connector section and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having slotted holes for inserting vertical leg of connector section. Connector section consists of a rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire.
7. Seismic Masonry-Veneer Anchors:

a. Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with projecting tabs having holes for inserting vertical legs of wire tie. Wire tie has sheet metal clip welded to it with integral tabs designed to engage continuous wire.
b. Connector section and a gasketed sheet metal anchor section, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and base for inserting connector section. Self-adhering, modified bituminous gasket fits behind anchor plate and extends beyond pronged legs. Connector section consists of a triangular wire tie and rigid PVC extrusion with snap-in grooves for inserting continuous wire.

8. Polymer-Coated, Steel Drill Screws for Steel Studs:
   a. ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83-mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B 117.

2.7 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
   1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch thick.
   2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
   3. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
   4. Fabricate metal drip edges for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam sheds water.
   5. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
   6. Solder metal items at corners.

B. Application: Unless otherwise indicated, use the following:
   1. Where flashing is indicated to receive counterflashing, use metal flashing.
   2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
   3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a metal drip edge.

4. Where flashing is fully concealed, use metal flashing.

C. Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn96, with acid flux of type recommended by stainless-steel sheet manufacturer.
2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

D. 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.

E. Termination Bars for Flexible Flashing: Aluminum or Stainless steel bars 1/8 inch by 1 inch.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.

B. Weep/Vent Products: Use one of the following unless otherwise indicated:
1. 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 less than depth of outer wythe, in color selected from manufacturer's standard.
2. Aluminum Weep Hole/Vent: Units made from sheet aluminum, designed to fit into a head joint and consisting of a vertical channel, with louvers stamped in web and with a top flap to keep mortar out of the head joint; factory primed and painted before installation to comply with Section 099113 "Exterior Painting" in color selected by Architect.

C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Configuration: Provide one of the following:
a. Sheets or strips, full depth of cavity and installed to full height of cavity.
b. Sheets or strips not less than 3/4 inch 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.

2.9 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.10 MORTAR 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 Masonry: Comply with ASTM C 270, Property 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 exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
   3. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. Pigmented Mortar: Use colored cement product. Do not add pigments to colored cement products.
   1. Pigments shall not exceed 10 percent of Portland cement by weight.
   2. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
   3. Mix to match Architect's sample.

E. 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.

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.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the 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.

D. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

E. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

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 or minus 1/4 inch.
   2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
   3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch 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, or 1/2 inch 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,1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch 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, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

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 to match existing masonry construction; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. 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.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Lay masonry units 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.
   1. At anchors and ties, fully bed units and fill cells with mortar as needed to fully embed anchors and ties in mortar.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
   1. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.6 EXPANSION JOINTS

A. General: Install expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.

B. Form expansion joints as follows:
   1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
   2. Build flanges of factory-fabricated, expansion-joint units into masonry.
   3. Build in compressible joint fillers where indicated.
   4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch.
   1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.7 LINTELS

A. Install steel lintels where indicated.

B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.8 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and 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 as recommended by flashing manufacturer.
   2. Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under weather-resistive barrier, lapping at least 4 inches. Fasten upper edge of flashing to sheathing through termination bar.
   3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
   4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
   5. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
   6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
   7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
   8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/vent products to form weep holes.
2. Space weep holes 24 inches o.c. unless otherwise indicated.
3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.9 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.

C. Testing Prior to Construction: One set of tests.

D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

3.10 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. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
   6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
   7. Clean stone trim to comply with stone supplier's written instructions.
   8. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.11 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. 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 042613

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members.

B. Structural steel support members and struts.

C. Base plates, shear stud connectors and expansion joint plates.

D. Grouting under base plates.

1.2 RELATED REQUIREMENTS

A. Section 053100 - Steel Decking: Support framing for small openings in deck.

B. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.3 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2017.

B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2018.

F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021a.

G. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2021, with Editorial Revision.

H. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.

I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

J. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

K. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2019.

L. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.

M. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.

N. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2022.

O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

P. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).

R. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.

S. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2020.

T. SSPC-SP 3 - Power Tool Cleaning; 2024.

U. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.

V. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Connections not detailed.
   3. Indicate cambers and loads.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Shop Drawings for custom designed castings: Provide project specific, scaled, stamped engineered shop drawings and calculations including:
   1. Design, detail and engineer castings including establishing interior and exterior dimensions and the preparation of casting specifications including material selection, non-destructive examination requirements, and all casting production parameters.

D. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

E. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.

F. Fabricator Test Reports: Comply with ASTM A1011/A1011M.

G. Materials Test Reports: Submit independent test results or engineered performance analysis of structural thermal-break pad performance in bearing or slip-critical connections where shear and moment loads are applied.

H. Product Test Reports:
   1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
   2. Direct-tension indicators.
   3. Tension-control, high-strength, bolt-nut-washer assemblies.
   4. Shear stud connectors.
   5. Shop primers.
   6. Nonshrink grout.
   7. Post-Installed Anchors
   8. Thermal break material

I. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

J. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
   1. Power source (constant current or constant voltage).
   2. Electrode manufacturer and trade name, for demand critical welds.

K. Designer's Qualification Statement.

L. Fabricator's Qualification Statement.

1.5 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN)"Steel Construction Manual."

B. Fabricator: Company specializing in performing the work of this section with minimum 20 years of documented experience.

C. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and no more than 12 months before start of scheduled welding work.
   1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

D. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

E. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Angles and Plates: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Steel Plates and Bars: ASTM A572/A572M, Grade 50 (345) high-strength, columbium-vanadium steel.

E. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C.

F. Pipe: ASTM A53/A53M, Grade B, Finish black.

G. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.

H. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.

I. Tension Control Bolts: Twist-off type; ASTM F3125/F3125M.

J. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or ASTM A563M nuts and ASTM F436/F436M Type 1 washers.

K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

L. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
   2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

M. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

N. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

O. TNEMEC Aerolon 971 Thermal Break Paint: Apply to steel at all locations where steel framing breaks the plane of the thermal envelope.

2.2 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors.

2.3 FINISH

A. Prepare structural component surfaces in accordance with SSPC-SP 3, unless noted otherwise as AESS thus requiring more stringent surface preparation.

B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or coated with TNEMEC Aerolon thermal break paint.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.2 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components and shear studs indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT)"Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Architect.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.3 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. Welded Connections: Visually inspect all field-welded connections per Statement of Special Inspections, and physically test all complete joint penetration groove welds (CJP), using the following:
   1. Ultrasonic testing performed in accordance with ASTM E164.

END OF SECTION 051200

SECTION 055210 - NON-PENETRATING ROOF FALL PROTECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Roof accessories including the following:
   1. Non-penetrating railing system for roof edge fall protection.

1.2 REFERENCES

A. OSHA 29 CFR 1910.23 - Guarding Floor and Wall Openings and Holes.

B. Americans with Disabilities Act Accessibility Guidelines (ADA).

C. American Society of Civil Engineer (ASCE):
   1. ASCE 7-16 - Minimum Loads and Associated Criteria for Buildings and Other Structures.

D. ASTM International (ASTM):
   1. ASTM A47 - Standard Specification for Ferritic Malleable Iron Castings.
   2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   3. ASTM A123 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   4. ASTM A500 - Standard Specification for cold-formed welded and seamless carbon steel structural tubing.
   5. ASTM B221 - Standard Specification for Aluminum and Aluminum Alloy extruded bars, rods, wires, profiles, and tubes.

E. Occupational Safety and Health Administration (OSHA):
   1. OSHA 1910.29 - Fall Protection systems and falling object protection.
   2. OSHA 1926.502 - Fall Protection systems criteria and practices.

F. Underwriters Laboratories (UL): UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.

1.3 SUBMITTALS

A. Submit under provisions of Section 013000 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.

3. Installation methods.

C. Shop Drawings: Including but not limited to indication of profiles, sizes, connections, sizes and types of fasteners and accessories; showing fabrication and installation of handrails and guardrails including but not limited to plans, elevations, sections, details of components, anchor details, and attachment to adjoining units of work.

D. Manufacturer's Certificates:
1. Certify that Railings and Base Castings are made in USA. Provide steel mill and foundry certificates for verification prior to shipment.
2. Manufacturer must be American Welding Society Welding Certified for Welding Standards AWS D1.1 and AWS D1.3. Third party qualification documentation required prior to shipment.

1.4 QUALITY ASSURANCE

A. Railings Structural Requirements:
1. Handrail, wall rail and guardrail assemblies and attachments shall withstand a minimum concentrated load of 200 lbs (90,719 g) applied horizontally or vertically down at any point on the top rail.
2. Handrail assemblies and guards shall be designed to resist a load of 50 lbs per linear ft (0.73 kN per m) applied in any direction at the top and to transfer this load through the supports to the structure.
3. Infill area of guardrail system capable of withstanding a horizontal concentrated load of 200 lbs (90719 g) applied to 1 sq ft (8165 g per sq m) at any point in the system. Load not to act concurrently with loads on top rail of system in determining stress on guardrail.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, Store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards. Store materials within absolute limits for temperature and humidity recommended by the manufacturer.
1. Materials to be delivered to the job site in good condition and adequately protected against damage as handrails are a finished product.
2. Store products in manufacturer's unopened packaging until ready for installation.
3. Protect finishes from damage.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings.
   1. Where field measurements cannot be made without delaying the railing fabrication and delivery, obtain guaranteed dimensions in writing by the Contractor and proceed with fabrication of products to not delay fabrication, delivery, and installation.

C. Coordinate fabrication and delivery schedule of handrails with construction progress and sequence to avoid delay of railing installation.

1.7 WARRANTY

A. Warranty: Provide manufacture's standard limited warranty.

1.8 PERFORMANCE REQUIREMENTS

A. Performance and Design Requirements: Pipe and tube railing and guardrail design.
   1. Comply with the following:
      a. International Building Code/International Code Council.
      b. OSHA Standard Pipe Railing: 1910.29 Fall Protection systems and falling object protection.
      c. Local code requirements by authorities having jurisdiction.
   2. Delegated Design: Railing design is to be the responsibility of a professional engineer, licensed in the same location as the project. See Section 014000 - Quality Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products manufactured by one of the following:
   1. BlueWater Manufacturing, Inc. by Tractel Ltd.
   2. Kattsafe
   3. Kee Safety, Inc.
   4. Peak Fall Protection, Inc.
   5. Safety Rail Company
   6. Or Approved Equal

B. Substitutions will be considered in accordance with provisions of Section 016000 - Product Requirements.

2.2 NON-PENETRATING ROOF GUARDRAIL FALL PROTECTION

A. Product: Non-Penetrating Roof Guardrail
   1. System: Modular components of top rail, midrail, posts and fittings. Designed with 42 inches toprail height, posts on 72 inch centers maximum, anchors, and fittings.
   2. Compliance: OSHA-compliant barrier, and BOCA building code.
   3. Rail and Post Material: 1-1/4 inches diameter minimum.
   4. Fittings: Pre-assembled to posts for installation of rails. Fittings secured by hex nut and key wrench.
   5. Finish: Factory-applied powder coated finish selected from manufacturer's standard colors.

2.3 FABRICATION

A. Comply with design and specified requirements.

B. Fit and shop assemble components in largest practical sizes for delivery to site.
   1. Provide weep holes where water may accumulate.
   2. No welded connections.
   3. Cap exposed railing ends.

C. Upright tops shall be plugged with weather and light resistant material.

D. Assemble components with joints tightly fitted and secured. Accurately form components to suit installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prepare substrates using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

C. Coordinate post setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete and masonry construction.
   1. Coordinate delivery of anchorages to project site.
   2. Coordinate that blocking is in place for all mounting fasteners.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals and in proper relationship with adjacent construction.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 055210

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SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Wood blocking and nailers.
   2. Wood furring and grounds.
   3. Wood sleepers.
   4. Plywood backing panels.

1.3 DEFINITIONS

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

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   1. NeLMA: Northeastern Lumber Manufacturers' Association.
   2. NHLA: National Hardwood Lumber Association.
   3. NLGA: National Lumber Grades Authority.
   4. SPIB: The Southern Pine Inspection Bureau.
   5. WCLIB: West Coast Lumber Inspection Bureau.
   6. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
5. Product Data: For adhesives, including printed statement of VOC content.
6. Product Data: For composite-wood products, documentation indicating that product contains no urea formaldehyde.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Preservative-treated wood.
2. Fire-retardant-treated wood.

1.5 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship:"
1. Dimension lumber framing.
2. Miscellaneous lumber.
3. Interior wood trim.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

B. Deliver interior wood materials that are to be exposed to view only after building is enclosed and weatherproof, wet work other than painting is dry, and HVAC system is operating and maintaining temperature and humidity at occupancy levels.

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. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   3. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX.)
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
   3. Wood framing members that are less than 18 inches (460 mm) above the ground in crawl spaces or unexcavated areas.
   4. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).
   1. Use treatment that does not promote corrosion of metal fasteners.
   2. Use Exterior type for exterior locations and where indicated.
   3. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
   4. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
   1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.

C. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

D. Application: Treat items indicated on Drawings, and the following:
   1. Concealed blocking.
   2. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 15 percent for 2 inch nominal (38 mm actual) thickness or less, 19 percent for more than 2 inch nominal (38 mm actual) thickness.

B. Other Framing: Construction, Stud, or No. 3 grade and the following species:
   1. Hem-fir (north); NLGA.
   2. Southern pine; SPIB.
   3. Douglas fir-larch; WCLIB or WWPA.
   4. Mixed southern pine; SPIB.
   5. Spruce-pine-fir; NLGA.
   6. Douglas fir-south; WWPA.
   7. Hem-fir; WCLIB or WWPA.
   8. Douglas fir-larch (north); NLGA.
   9. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Cants.
   4. Furring.
   5. Grounds.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

C. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 19 percent maximum moisture content and the following species:
   1. Hem-fir (north); NLGA.

2. Mixed 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.

D. For exposed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:
1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
2. Mixed southern pine, No. 2 grade; SPIB.
3. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
4. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

E. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine, No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north), Standard or 3 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Standard or 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods, No. 3 Common grade; NELMA.
5. Northern species, No. 3 Common grade; NLGA.
6. Western woods, Standard or No. 3 Common grade; WCLIB or WWPA.

F. 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.

G. 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.

H. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

A. Equipment and Casework Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch (13 mm) nominal thickness that contains no urea formaldehyde.

2.7 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 A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

H. 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.

2.8 MISCELLANEOUS MATERIALS

A. Adhesives for Gluing Furring to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
   1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

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 to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, trim and partition mounted or supported equipment including cabinets and accessories.

D. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

E. Sort and select lumber so that natural characteristics will 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 AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

G. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's Uniform Building Code.
4. Table 2305.2, "Fastening Schedule," in BOCA's BOCA National Building Code.
5. Table 2306.1, "Fastening Schedule," in SBCCI's Standard Building Code.
6. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
7. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's International One and Two Family Dwelling Code.

H. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD GROUND, BLOCKING, AND NAILER 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.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

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.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1 by 3 inch nominal (19 by 63 mm actual) size furring horizontally at24 inches (610 mm) o.c.

C. 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 PROTECTION

A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

SECTION 061600 - SHEATHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wall sheathing.
   2. Roof sheathing.
   3. Specialty sheathing.
   4. Subflooring and underlayment.
   5. Sheathing joint-and-penetration treatment materials.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
   3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5516.
   4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Shop Drawings: For sheathing assemblies.
   1. Show locations and extent of sheathing, accessories, and assemblies specific to Project conditions.
   2. Include details for sheathing joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
   3. Include details of interfaces with other materials that form part of air barrier.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: From sheathing manufacturer, certifying compatibility of sheathing accessory materials with Project materials that connect to or that come in contact with the sheathing.

B. Product Test Reports: For sheathing assembly, indicating compliance with specified requirements, for tests performed by a qualified testing agency.

C. Evaluation Reports: For the following, from ICC-ES:
   1. Wood-preservative-treated plywood.
   2. Fire-retardant-treated plywood.

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of sheathing.
   1. Installer is to be licensed by ABAA in accordance with ABAA's Quality Assurance Program and is to employ ABAA-certified installers and supervisors on Project.

B. Testing Agency Qualifications:
   1. 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.
   2. For testing and inspecting agency providing tests and inspections related to sheathing: an independent agency, qualified in accordance with ASTM E329 for testing indicated, and certified by Air Barrier Association of America, Inc.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested in accordance with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

B. Sheathing Performance: sheathing assembly, and seals with adjacent construction, are to be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies are to be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, tie-ins to other installed air barriers, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.2 WOOD PANEL PRODUCTS

A. Emissions: Products are to meet 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."

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b for exterior construction items not in contact with ground and Use Category UC4a for exterior construction items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat all plywood unless otherwise indicated.

2.4 WALL SHEATHING

A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2 sheathing.
1. Span Rating: Not less than 16/0.
2. Nominal Thickness: Not less than 11/32 inch.

B. Oriented-Strand-Board Sheathing: DOC PS 2 sheathing.
1. Span Rating: Not less than 16/0.
2. Nominal Thickness: Not less than 5/16 inch.

C. Glass-Mat Gypsum Sheathing, Walls: ASTM C1177/C1177M.
   1. Type and Thickness: Type X, 5/8 inch thick.

2.5 ROOF SHEATHING

A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2 sheathing.
   1. Span Rating: Not less than 16/0.
   2. Nominal Thickness: Not less than 15/32 inch.

B. Oriented-Strand-Board Sheathing: DOC PS 2 sheathing.
   1. Span Rating: Not less than 16/0.
   2. Nominal Thickness: Not less than 7/16 inch.

2.6 SPECIALTY SHEATHING

A. Exterior Insulated Sheathing with Moisture and Air Protection:
   1. Basis of Design Product: Where indicated, subject to compliance with requirements, provide Zip System Insulated R-Sheathing manufactured by Huber Engineered Woods, or a comparable product by one of the following:
      a. Kingspan Group
      b. LP Building Solutions
      c. Owens Corning
      d. Ox Engineered Products
   2. Size: 48 inch by 96 inch minimum boards.
   3. R-Value: Varies per application.
      a. Exterior Walls: Single layer, R-7.5 minimum, 2 inch thick minimum.
      b. Roofs: Triple layer, stagged assembly, R-30 minimum, 6 1/2 inch thick minimum.
   4. Air Barrier Rating: ASTM E 2178 <0.02 L/S*m2 @ 75 Pa or ASTM E 2357 <0.2 L/S*m2 @ 75 Pa

2.7 SUBFLOORING AND UNDERLAYMENT

A. Plywood Combination Subfloor-Underlayment: DOC PS 1 single-floor panels.
   1. Span Rating: Not less than 16.
   2. Nominal Thickness: Not less than 23/32 inch.
   3. Edge Detail: Square.
   4. Surface Finish: Fully sanded face.

B. Oriented-Strand-Board Combination Subfloor-Underlayment: DOC PS 2, Exposure 1 single-floor panels.
   1. Span Rating: Not less than 16.
   2. Nominal Thickness: Not less than 23/32 inch.
   3. Edge Detail: Square.

4. Surface Finish: Fully sanded face.

2.8 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
   1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
   2. For roof and wall sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours in accordance with ASTM B117.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
   1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C1002.
   2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C954.

G. Screws for Fastening Composite Nail Base Insulated Roof Sheathing to Metal Roof Deck: Steel drill screws, in type and length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours in accordance with ASTM B117. Provide washers or plates if recommended by sheathing manufacturer.

2.9 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

2.10 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with ASTM D3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:
   1. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
   2. ICC-ES evaluation report for fastener.

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 INSTALLATION OF WOOD STRUCTURAL PANEL

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:
   1. Combination Subfloor-Underlayment:
      a. Glue and nail to wood framing.
      b. Screw to cold-formed metal framing.
      c. Space panels 1/8 inch apart at edges and ends.
      d. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.
   2. Wall and Roof Sheathing:
      a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
      b. Screw to cold-formed metal framing.
      c. Space panels 1/8 inch apart at edges and ends.

3.3 INSTALLATION OF GYPSUM SHEATHING

A. Comply with GA-253 and with manufacturer's written instructions.
   1. Fasten gypsum sheathing to wood framing with nails or screws.
   2. Fasten gypsum sheathing to cold-formed metal framing with screws.
   3. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
   4. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
   1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
   2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
   1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.

2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.
   1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
   2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

F. Sheathing:
   1. Install accessory materials according to sheathing manufacturer's written instructions and details to form a seal with adjacent construction, to seal fasteners, and ensure continuity of air and water barrier.
      a. Coordinate the installation of sheathing with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
      b. Install transition strip on roofing membrane or base flashing, so that a minimum of 3 inches of coverage is achieved over each substrate.
   2. Connect and seal sheathing material continuously to air barriers specified under other Sections as well as to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
   3. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
   4. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip or preformed silicone extrusion, so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
      a. Transition Strip: Roll firmly to enhance adhesion.
      b. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.
   5. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of sheathing material with foam sealant.
   6. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

7. Seal top of through-wall flashings to sheathing with an additional 6-inch wide, transition strip.
8. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
9. Repair punctures, voids, and deficient lapped seams in strips and transition strips extending 6 inches beyond repaired areas in strip direction.

3.4 FIELD QUALITY CONTROL

A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.

B. Testing and Inspecting Agency: Engage a qualified testing agency to perform tests and inspections.

C. Inspections: sheathing, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
3. Termination mastic has been applied on cut edges.
4. Strips and transition strips have been firmly adhered to substrate.
5. Compatible materials have been used.
6. Transitions at changes in direction and structural support at gaps have been provided.
7. Connections between assemblies (sheathing and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
8. All penetrations have been sealed.

D. Sheathing and air barriers will be considered defective if they do not pass inspections.

E. Repair damage to sheathing and air barriers caused by testing; follow manufacturer's written instructions.

F. Prepare test and inspection reports.

END OF SECTION 061600

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SECTION 072100 - THERMAL INSULATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Foam-plastic board insulation.
   2. Mineral-wool blanket insulation.
   3. Spray-applied cellulosic insulation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Foam-plastic board insulation.
   2. Mineral-wool blanket insulation.
   3. Spray-applied cellulosic insulation.

1.4 INFORMATIONAL SUBMITTALS

A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.
   1. For blown-in or sprayed fiberglass and cellulosic-fiber loose-fill insulation, indicate initial installed thickness, settled thickness, settled R-value, installed density, coverage area, and number of bags installed.
   2. Sign, date, and post the certification in a conspicuous location on Project site.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Research Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:
   1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
   2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
   3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Extruded Polystyrene Board Insulation, Type IV for Exterior Wall Assemblies.
ASTM C578, Type IV, 30-psi minimum compressive strength; unfaced.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by Owens Corning, or comparable product by one of the following:
      a. BASF Corporation
      b. DiversiFoam Products.
      c. Gaco Western, Inc.
      d. Johns Manville.
      e. Kingspan Products.
      f. Knauf Insulation.
      g. Resisto, a Division of Soprema.
      h. Rockwool Products.
      i. The Dow Chemical Company.
   2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
   3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
   4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

B. Extruded Polystyrene Board Insulation, Type V for Below-Grade Applications.
ASTM C578, Type V, 100-psi minimum compressive strength.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by Owens Corning, or comparable product by one of the following:
      a. BASF Corporation
      b. DiversiFoam Products.
      c. Gaco Western, Inc.
      d. Johns Manville.
      e. Kingspan Products.

f. Knauf Insulation.
g. Resisto, a Division of Soprema.
h. Rockwool Products.
i. The Dow Chemical Company.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.

2.2 MINERAL-WOOL BLANKET INSULATION

A. Mineral-Wool Blanket Insulation, Unfaced for Cavities in Interior and Exterior Walls and Partitions. ASTM C665, Type I (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.
1. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by Rockwool Products, or comparable product by one of the following:
a. BASF Corporation
b. DiversiFoam Products.
c. Gaco Western, Inc.
d. Johns Manville.
e. Kingspan Products.
f. Knauf Insulation.
g. Owens Corning.
h. Resisto, a Division of Soprema.
i. The Dow Chemical Company.
2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.

2.3 SPRAY-APPLIED CELLULOSIC INSULATION

A. Self-Supported, Spray-Applied Cellulosic Insulation for Exterior Wall Assemblies. ASTM C1149, Type II (materials containing a dry adhesive activated by water during installation; intended only for enclosed or covered applications, chemically treated for flame-resistance, processing, and handling characteristics.
1. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by BASF Corporation, or comparable product by one of the following:
a. DiversiFoam Products.
b. Gaco Western, Inc.
c. Johns Manville.

d. Kingspan Products.
e. Knauf Insulation.
f. Owens Corning.
g. Resisto, a Division of Soprema.
h. Rockwool Products.
i. The Dow Chemical Company.

2.4 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
   1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

C. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch minimum between face of insulation and substrate to which anchor is attached.

D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

2.5 ACCESSORIES

A. Insulation for Miscellaneous Voids:
   1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
   2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
   3. Polyurethane Pour-In-Place Insulation: Closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84, specifically formulated for pour-in-place applications.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

C. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install insulation with manufacturer's R-value label exposed after insulation is installed.

D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
   1. Extend insulation full depth of vertical face of slab edge and interior foundation wall surface, where indicated in drawings.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
   1. Extend insulation beneath entire surface of slab on grade assemblies, including but not limited to slabs and aprons containing radiant heating.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
   1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions.
   2. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.
   3. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.
   4. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
   5. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
   2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
   3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
   4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
   1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

C. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation according to manufacturer's written instructions.
   1. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked.
   2. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

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SECTION 072600 - VAPOR RETARDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vapor retarders.

1.2 DEFINITIONS

A. Vapor Retarder: Airtight barrier made of material that is relatively water vapor impermeable, to degree specified, with seams and joints sealed to adjacent surfaces.

B. Vapor Retarder Class: A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class is defined using Procedure A, Desiccant Method at 73 degrees F and 50 percent Relative Humidity (RH), in accordance with ASTM E96/E96M and ICC (IBC)-2018, as follows:
   1. Class I: 0.1 perm or less.
   2. Class II: Greater than 0.1 perm to 1.0 perm.
   3. Class III: Greater than 1.0 perm to 10 perms.
   4. Vapor Permeable: 5 perms or greater.

1.3 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

C. ASTM D751 - Standard Test Methods for Coated Fabrics; 2019.

D. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2017).

E. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.

F. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications; 2016.

G. ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay; 2017 (Reapproved 2021).

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

J. ICC (IBC)-2018 - International Building Code; 2018.

K. ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials; 2017.

L. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing; 2015.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

E. Installer's qualification statement.

F. Testing agency qualification statement.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.6 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.1 VAPOR RETARDERS

A. Vapor Retarder Coating: Liquid applied, resilient, ultra-violet (UV) light resistant coating; associated joint treatment.

1. Water Vapor Permeance: 1.0 perm, maximum, when tested in accordance with ASTM E96/E96M.
2. VOC Content: Less than 6.68 oz/gal, when tested in accordance with 40 CFR 59, Subpart D - EPA Method 24.
3. Resistance to Fungal Growth: No growth when tested in accordance with ASTM D5590.
4. Suitable for use on concrete, masonry, plywood, and gypsum sheathing.
5. Joint Preparation Treatment: Provide coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
6. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.
7. Products:
    a. Carlisle Coatings and Waterproofing: www.carlisleccw.com/#sle.
    b. Epro Services, Inc: www.eproserv.com/#sle.
    c. H.B. Fuller Construction Products, Inc: www.fosterproducts.com/#sle.
    d. Henry Company: www.henry.com/#sle.
    e. Hohmann & Barnard, Inc: www.h-b.com/#sle.
    f. LATICRETE International, Inc: www.laticrete.com/#sle.
    g. PROSOCO, Inc: www.prosoco.com/r-guard/#sle.
    h. W.R. Meadows, Inc: www.wrmeadows.com/#sle.
    i. Substitutions: See Section 016000 - Product Requirements.

2.2 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Vapor Retarder and Adjacent Substrates: As indicated, complying with vapor retarder manufacturer's installation instructions.

B. Sealant for Cracks and Joints in Substrates: Resilient elastomeric joint sealant compatible with substrates and vapor retarder materials.
1. Application: Apply at 30 to 40 mil, 0.030 to 0.040 inch, nominal thickness.
2. Color: Manufacturer's standard.
3. Elongation: 1,300 percent, measured in accordance with ASTM D412.
4. Peel Adhesion: 28 lb/inch, minimum, when tested in accordance with ASTM D903.
5. Hydrostatic Head Pressure: Resists head pressure of 57 feet, maximum, when tested in accordance with ASTM D751.

C. Primer: Liquid applied polymer.
1. Color: Manufacturer's standard.
2. Elongation: 1,300 percent, measured in accordance with ASTM D412.

D. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
1. Width: Manufacturer's standard for wall/partition width.

2. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 30 days of weather exposure.

E. Liquid Flashing: One part, fast curing, nonsag, elastomeric, gun grade, trowelable.

F. Thinners and Cleaners: As recommended by vapor retarder manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions comply with requirements of this section.

3.2 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.3 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Vapor Retarders: Install continuous airtight barrier over surfaces indicated, with sealed seams and sealed joints to adjacent surfaces.

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Vapor Retarder Coatings:
1. Prepare substrate in accordance with coating manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
2. Apply bead or trowel coat of mastic sealant with minimum thickness of 1/4 inch along coating seams, rough cuts, and as recommended by manufacturer.
3. Apply flashing to seal with adjacent construction and to bridge joints in coating substrate.

3.4 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Owner’s Inspection and Testing: Cooperate with Owner’s testing agency.
1. Allow access to work areas and staging.

2. Notify Owner's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
3. Do not cover work of this section until testing and inspection is accepted.

C. Do not cover installed vapor retarders until required inspections have been completed.

D. Obtain approval of installation procedures from vapor retarder manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

E. Take digital photographs of each portion of installation prior to covering up vapor retarders.

3.5 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION 072600

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SECTION 074243 - COMPOSITE INFILL PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Composite non-rated insulated infill panel systems and accessories for exterior applications.

B. Composite fire-rated insulated infill panel systems and accessories for interior and louver infill applications.

1.2 RELATED REQUIREMENTS

A. Section 072500 - Weather Barriers.

B. Section 099100 - Painting

1.3 REFERENCES

A. AAMA 509 - Voluntary Test and Classification Method for Drained and Back Ventilated Rainscreen Wall Cladding Systems; 2022.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

G. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

H. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets; 2022, with Editorial Revision (2023).

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

K. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

L. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

M. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate layout, panel locations, and configuration.
1. Indicate size, spacing, and location of support and attachment components, connections, and types and locations of fasteners.
2. Indicate necessary provisions for structural and thermal movement between wall panel system and adjacent materials.
3. Indicate locations and sizes of penetrations through wall panel system for Architect's approval.

C. Samples: Submit two samples of each style and color panel, 12 by 12 inches in size and showing finish color, sheen, and texture.

D. Manufacturer's Instructions: Include instructions for storage, handling, preparation, and product installation.

E. Manufacturer's Field Reports: Submit weekly reports of site inspection conducted by manufacturer's qualified installer.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

H. Maintenance Data: Periodic inspection recommendations and maintenance procedures.

I. Executed panel manufacturer's warranty.

J. Executed finish warranty.

K. Executed installation warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least ten years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section with minimum three years of documented experience and approved by manufacturer.

1.6 MOCK-UPS

A. See Section 014000 - Quality Requirements for additional requirements.

B. Construct mock-up of each panel type. Include panel materials, attachments, anchors, trim and termination accessories, and perimeter sealant.

C. Locate where directed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials with labels intact in manufacturer's unopened packaging until ready for installation.

B. Store products under waterproof cover, well ventilated, and elevated above grade on flat surface.

C. Protect materials from harmful environmental elements, construction dust, direct sunlight, and other potentially detrimental conditions.

1.8 FIELD CONDITIONS

A. Do not install panels when air temperature or relative humidity are outside manufacturer's limits.

1.9 WARRANTY

A. Manufacturer Warranty: Provide 2-year manufacturer warranty for panels. Complete forms in Owner's name and register with manufacturer.

B. Finish Warranty: Provide 5-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. All Weather Insulated Panels; www.awipanels.com/#sle

B. Centria, A Nucor Company; www.centria.com/#sle

C. Citadel Architectural Products; www.citadelap.com/#sle

D. Mapes Industries, Inc.; www.mapespanels.com/#sle

E. Metl Span, A Nucor Company; www.metlspan.com/#sle

F. Nudo, A Verzatec Company; www.nudo.com/#sle.

G. Substitutions: See Section 016000 - Product Requirements.

2.2 COMPOSITE INFILL PANELS (NON-RATED)

A. Panel Style: Non-rated with insulating core, manufactured between exterior and interior substrates, and exterior and interior finishes, for exterior window, storefront, and curtain wall applications.
   1. Height: As indicated on drawings
   2. Length: As indicated on drawings
   3. Thickness: 3" minimum, 1" unit with 2" rabbet edge backer panel.
   4. Core Material: Polyisocyanurate Insulation (minimum R-6 per inch).
   5. Substrate Material:
      a. Interior Substrate (Building Side): Tempered Hardboard, minimum 1/8" thickness.
      b. Exterior Substate (Outdoor Side): Corrugated polypropylene.
   6. Finish Materials:
      a. Interior Finish (Building Side):
         1) Standard 0.032-inch thick polyvinylidene fluoride (PVDF) finish. Color to be selected by Architect from full range.
      b. Exterior Finish (Outdoor Side):
         1) Standard 0.032-inch thick polyvinylidene fluoride (PVDF) finish. Color to be selected by Architect from full range.

2.3 COMPOSITE INFILL PANELS (FIRE RATED)

A. Panel Style: Fire-rated with insulating core, manufactured between exterior and interior substrates, and exterior and interior finishes, for interior and louver infill applications.
   1. Height: As indicated on drawings
   2. Length: As indicated on drawings
   3. Thickness: 1" minimum
   4. Core Material: Polystyrene Insulation (minimum R-4.8 per inch).
   5. Substrate Material:
      a. Interior Substrate (Corridor Side): 5/8" Type X gypsum wall board.
      b. Exterior Substate (Room Side): Tempered Hardboard, minimum 1/8" thickness.

6. Finish Materials:
    a. Interior Finish (Corridor Side):
        1) For Mechanical Rooms, Electrical Rooms, Custodial Closets, and Storage Rooms: Paint on specified substrate. Color to be selected by Architect from full range.
        2) For All Other Spaces: Baked Enamal on specified substrate. Color to be selected by Architect from full range.
    b. Exterior Finish (Room Side):
        1) For Mechanical Rooms, Electrical Rooms, Custodial Closets, and Storage Rooms: Paint on specified substrate. Color to be selected by Architect from full range.
        2) For All Other Spaces: Baked Enamal on specified substrate. Color to be selected by Architect from full range.
7. Fire Performance: 20-Minute Fire Rated when tested in accordance with ASTM E119.
8. Panel Surface Burning Characteristics: Class A Fire Rated when tested in accordance with ASTM E84.

2.4 ACCESSORIES

A. Concealed Clip System: Manufacturer's standard system consisting of starter tracks, panel clips, corner clips, sealant backers, and spacers.

B. Exposed Fastener System: Corrosion-resistant; panel manufacturer's standard for installation indicated.

C. Furring Strips: Galvanized metal channels.

D. Trim: Same material and texture as panel.

E. Metal Trim: Extruded aluminum, ASTM B221.
1. Dimension and Layout: As indicated on drawings.
2. Finish: Powder coating.
3. Color: As selected by Architect.

F. Flashing: Manufacturer's standard sheet aluminum; finish and color to match panels.

G. Sealant: ASTM C920, Class 35, elastomeric, polyurethane or silyl-terminated polyether/polyurethane, and capable of being painted.

H. Finish Paint: Latex house paint acceptable to wall panel manufacturer; primer recommended by paint manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrate; clean and repair as required to eliminate conditions detrimental to proper installation.

B. Verify that water-resistive barrier has been properly installed and approved.

C. Do not begin installation until unacceptable conditions have been corrected.

3.2 PREPARAI

A. Touch up field cut edges before installing.

B. Protect surrounding areas and adjacent surfaces from damage during execution of this work.

3.3 INSTALLATION

A. Install cladding in accordance with manufacturer's installation instructions and approved shop drawings.

B. Panels:
1. Install in accordance with manufacturer's instructions.
2. Install wall panels with manufacturer's recommended concealed attachment system.
3. Allow space for thermal movement at ends of wall panels that butt against trim; seal joint between panel and trim.

C. After installation, seal joints. Include joints around penetrations and between wall panels and adjacent construction.

D. Paint exposed cut edges.

3.4 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Remove temporary covers and strippable films before installation of panels. Where film occurs on both sides of panels, remove film from both sides simultaneously.

C. Clean exposed work upon completion of installation; remove grease and oil films, excess joint sealer, handling marks, and debris. Leave work clean, unmarked, and free from dents, creases, waves, scratch marks, or other damage to finish.

3.5 PROTECTION

A. Protect installed products until Date of Substantial Completion.

END OF SECTION 074243

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SECTION 074633 - PLASTIC SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Plastic siding and trim.

1.2 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Siding substrate.

B. Section 079200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.3 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.

E. ASTM D3679 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Siding; 2021.

F. ASTM D4477 - Standard Specification for Rigid (Unplasticized) Poly(Vinyl Chloride) (PVC) Soffit; 2022.

G. ASTM D5206 - Standard Test Method for Windload Resistance of Rigid Plastic Siding; 2019.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

I. VSI (INST) - Vinyl Siding Installation Manual; 2020.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Samples: Provide samples in colors specified, not less than 12 inches in length.

D. Color Samples: Where colors are not specified, provide samples of manufacturer's entire color line for selection.

E. Installer's qualification statement.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Not less than three years of experience with products specified.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

A. Do not install siding when air temperature or relative humidity are outside manufacturer's limits.

1.8 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Plastic Siding:
   1. AZEK Building Products, Inc: www.azek.com/#sle.
   2. CertainTeed Corporation: www.certainteed.com/#sle.
   3. Ply Gem Industries, Inc: www.plygem.com/#sle.
   4. Sagiper North America Inc: www.sagipernorthamerica.com/#sle.
   5. Substitutions: See Section 016000 - Product Requirements.

2.2 MATERIALS

A. General Requirements:
1. Siding: Complying with ASTM D3679.
2. Wind Resistance: Capable of withstanding minimum of 30 psf negative pressure, when tested in accordance with ASTM D5206.
3. Horizontal Flammability: When tested in accordance with ASTM D635.
a. Burn Distance: 0.79 inch, maximum.
b. Burn Time: Less than five seconds.

B. Plastic Siding Sheets:
1. Thickness: 1/2 inch, minimum.
2. Length: Cut to size indicated on drawings.
3. Nailing Hem: Single layer, with 1-1/8 inch long nail holes at maximum 18 inch on center.
4. Finish: Smooth.
5. Color: As selected by Architect from manufacturers full range of available colors.

2.3 ACCESSORIES

A. Accessories: Provide coordinating accessories made of same material as required for complete and proper installation even when not specifically indicated on drawings.

B. Trim Boards
1. Color: Match adjacent siding or soffit panels.
2. Length: Cut to size indicated on drawings.
3. Profiles: Square edge, mitered at corners
a. Thickness: 5/4" nominal, minimum
b. Depth: 4" nominal, minimum

C. Fasteners: Aluminum nails, alloy 5056 or 6110, with minimum tensile strength of 63,000 psi; length as required to penetrate framing at least 3/4 inch.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrate conditions before beginning installation; verify dimensions and acceptability of substrate.

B. Do not proceed with installation until unacceptable conditions have been corrected.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Protect surrounding areas and adjacent surfaces during execution of this work.

3.3 INSTALLATION

A. Install siding, soffit, and trim in accordance with manufacturer's printed installation instructions and VSI (INST).

B. Attach securely to framing, not sheathing, with horizontal components true to level and vertical components true to plumb, providing a weather resistant installation.

C. Clean dirt from surface of installed products, using mild soap and water.

3.4 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Clean exposed work upon completion of installation; remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to finish.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 074633

SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Adhered ethylene-propylene-diene-monomer (EPDM) roofing system.
   2. Mechanically fastened, ethylene-propylene-diene-monomer (EPDM) roofing system.
   3. Roof insulation, including tapered insulation.

B. Related Requirements:
   1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Section 072100 "Thermal Insulation" for insulation beneath the roof deck.
   3. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counter-flashings.
   4. Section 077100 "Roof Specialties" for manufactured copings.
   5. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.
   1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements, are compatible as demonstrated by roofing system manufacturer testing and field experience and accepted by roofing system manufacturer as an approved manufacturer’s system.
1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
1. Layout and thickness of insulation.
2. Base flashings and membrane terminations.
3. Flashing details at penetrations.
4. Tapered insulation, thickness, slopes, and crickets.
5. Roof plan showing orientation of steel roof deck and orientation of roof membrane and fastening spacings and patterns for mechanically fastened roofing system.
6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
7. Adhesive application patterns and spacings for adhesion to metal deck, insulation and membranes within 16-feet of roof perimeters and inside the 16-foot perimeter.

C. Samples for Verification: For the following products:
1. 12 inch by 12 inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Manufacturer Certificates:
   1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements".
      a. Submit evidence of complying with performance requirements.
   2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Product Test Reports: For components of roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

D. Evaluation Reports: For components of roofing system, from ICC-ES.
   1. Field Test Reports:
   2. Concrete internal relative humidity test reports.
   3. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

E. Field quality-control reports.

F. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed or listed in FM Approvals' RoofNav for roofing system identical to that used for this Project.

B. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing roofing similar to that required for this Project and who is approved, authorized, certified or licensed by the roofing system manufacturer to install manufacturer's product.

C. Age of Materials: All materials shall be manufactured within 9 months of its scheduled installation in this Project, or sooner if so recommended by the manufacturer.

D. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location, at least 8-inches above grade or 4-inches above roof level. Comply with insulation manufacturer's written instructions for handling, and storing during installation. Where material is stored subject to weather, completely cover tops and sides with plastic tarps at all times.

D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
   1. No roofing shall be done during inclement weather of any degree. Temperature shall be 40 deg. F and rising. Perform no roofing work unless roof deck and existing roofing insulation to remain are completely dry, free from any water, dew, frost, ice or snow. Follow manufacturer’s instruction for storage, handling, and use of materials during cold weather.

B. Where applicable, remove existing roofing materials, and prepare for reroofing, only that area that can be made watertight by installing new roof assembly by the end of the normal working day. It is not the intent of this paragraph that the Contractor work beyond the normal working day, except in case of emergency. Phased construction extending beyond one day shall not be permitted.
   1. If, due to unforeseen circumstances, the work is delayed, the Contractor shall continue work until the entire area from which roofing was removed has been completely reroofed before leaving the site. Under no circumstances shall any roof area be left open at the end of the day’s work.
   2. Roof shall be left in water-tight and moisture-tight, condition at end of each day’s work, including roof edges and flashing as required,

3. Take all reasonable precautions to ensure that Contractor is not caught during the working day by rain.
4. Maintain on hand on the deck for emergency use suitable approved material sufficient to temporarily cover open areas of the roof.
5. It is of prime importance to prevent water from entering the building due to conditions caused by these operations and is the responsibility of the Contractor to take precautions at all times during the progress of the work, at nights, over weekends and during periods when work may be delayed by inclement weather.
6. Protect areas of existing and new roofing where new flashings are installed or sheet metal, mechanical, and other repair work will be required by using plywood or planks laid "flat" on the roof for protection.
7. Protect completed roofs used to access other work areas. Provide plywood panel paths from work area to temporary access stairs, trash chutes and crane loading areas. Rope off access path with surface mounted posts, rope and ribbon flagging at 24-inches on center or plastic snow-fencing.

C. Protection of Existing Building and Surrounding Features: As follows:
1. Protect existing roof surfaces to remain from dirt, job traffic and overloading of stored materials.
2. Install closed chutes or other suitable approved protection from the roof to the ground, to prevent damage to the building where existing roofing is to be removed and discarded from the roof to the ground. Protect glazing and other building materials from damage or staining by using suitable coverings.
3. Protect trees, lawn, shrubs, and other elements within staging area to prevent damage to existing elements.
4. Provide fencing and barricades, as approved by the Architect, to seal off and protect staging areas over which material will be moved. Fencing must be of adequate type and height, securely installed and maintained to seal off areas from students and staff in order to prevent injury or damage. All protection and safety-related items shall be the responsibility of the Contractor.
5. Cooperate with the Owner in order not to block off any roads, walks, exit doors or service areas. Observe Owner's rules and regulations and restrict access over routes shown on the Drawings. The main entry to the building must be kept open and usable.
6. Cordon off adjacent existing roof, noted as NIC (Not In Contract).
7. At completion of project, remove all fences and other protection. Restore all roads, walks, lawns, shrubs, trees and any other site and building elements that were damaged during construction.

D. Coordination with Owner as follows:
1. At specific times during the day and on specific days, cease work that generates loud noise. The Owner's schedule of hours and days will be provided prior to the start of work. Quiet time shall include, but is not limited to, the following:

a. Weekday hours included in a written notice from the Owner and delivered to the Contractor a minimum of 21 days prior to Owner's event.
b. Weekend hours included in a written notice from the Owner and delivered to the Contractor a minimum of 21 days prior to Owner's event.
c. Loud noise includes, but is not limited to; roof material removal, use of trash chutes, placing or removing waste containers and backing up construction vehicles.

2. Submit construction schedule to Owner 21 days in advance of work start to provide Owner time to notify building inhabitants and implement safety procedures.

1.11 WARRANTY

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, substrate board, and other components of roofing system.
2. Warranty Period: 20 years from Date of Substantial Completion.

C. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, roof insulation, fasteners, and substrate boards for the following warranty period:
1. Warranty Period: Two years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing system and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and flashings shall remain watertight.
1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the Resistance to Foot Traffic Test in FM Approvals 4470.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
   1. Zone 1 (Roof Area Field): 20 lbf/sq. ft. 0.95 kPa/sq. m).
   2. Zone 2 (Roof Area Perimeter): 30 lbf/sq. ft. (1.42 kPa/sq. m).
   3. Zone 3 (Roof Area Corners): 30 lbf/sq. ft. (1.42kPa/sq. m).

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
   1. Fire/Windstorm Classification: Class 1A-90.

E. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 MATERIAL AND EQUIPMENT

A. Use approved type of equipment for removal of ballast and roofing that will not damage or destroy the roofing elements to remain, nor adjacent roofs not in Contract.

B. Approved hoists, cranes, chutes, and other mechanical listing equipment shall be of the size and placed to avoid any physical contact with the building walls or structure. Chutes, if approved, shall not allow the spread of dust or debris. Submit plans for approval.

2.3 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturer approved by roof membrane manufacturer.

2.4 ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

A. EPDM Sheet: Uniform, flexible sheet formed from a monomer of ethylene-propylene-diene, complying with ASTM D 4637, Type 1, of the following grade, class, thickness, and exposed face color:
   a. Grade and Class: Grade 1 and Class U, non-reinforced.
   b. Thickness: 60 mils (1.5 mm), nominal.

c. Color: Black.
d. Fire retardant, Class A material.

B. Basis of Design Product: Subject to compliance with requirements, provide RubberGard MAX EPDM Roofing (60 mil) by Firestone Building Products, or a comparable product by one of the following:
a. Carlisle SynTec Incorporated.
b. Johns Manville; a Berkshire Hathaway company.
c. Versico Roofing Systems

2.5 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: 60 mil thick EPDM, partially cured or cured, according to application.

C. Slip Sheet: Manufacturer's standard, of thickness required for application.

D. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

E. Roof Vents: As recommended by roof membrane manufacturer.
1. Size: Not less than 4-inch diameter.

F. Bonding Adhesive: Manufacturer's standard.

G. Splice Adhesive and Cleaner: Single-component butyl splicing adhesive and solvent-based splice cleaner.

H. Splice Primer and Tape: Manufacturer’s standard synthetic rubber polymer primer. 3 inch wide minimum butyl splice tape with release film at all membrane splices; and 3 inch wide minimum butyl splice tape with release film elsewhere.

I. Seam Cove Tape: 6-inch wide, minimum, pressure sensitive flashing.

J. Lap Sealant: Manufacturer's standard single-component sealant.

K. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

L. Metal Termination Bars: Manufacturer's standard, predrilled aluminum bars, approximately 1 inch wide, roll formed and prepunched, with ledge for sealant.

M. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer.

N. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

O. Wood Fiber Materials: Use of any wood fiber materials is prohibited.

P. Insulation and Steel Deck Adhesive: Manufacturer's standard VOC compliant, low-rise foam.

2.6 ROOF INSULATION

A. General: Roof insulation selected shall be compatible to the roof membrane and insulation to remain. The insulating value of the total roof system shall be a minimum R of 30. R values for insulation calculations shall be industry-accepted standards for "aged" insulation. For polyisocyanurate, use R +5.7 per inch of thickness or manufacturer's tested aged values. Roof insulation, both flat and tapered under an adhered membrane, shall have a minimum of 25 psi compressive strength, as certified in writing by the manufacturer and affixed to shipping manifest.
   1. Provide preformed, tapered insulation boards where indicated for sloping to drain. Fabricate with taper as indicated on Drawings.
      a. Polyisocyanurate: Minimum 0.5 inch at bottom edge of taper.
   2. Provide preformed saddles, crickets, tapered edge strips and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated. Field tapering of insulation shall not be permitted.
      a. Provide polyisocyanurate insulation saddle panels 0.25 inch per foot taper.
   3. Use of wood fiber materials is prohibited.

B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2 felt or glass-fiber mat facer on both major surfaces.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Carlisle SynTec Incorporated.
      b. Firestone Building Products.
      c. Johns Manville; a Berkshire Hathaway company.
      d. NRG Barriers, Inc.
      e. Versico Roofing Systems
   2. Compressive Strength: 25 psi.
   3. Size: Maximum 48 inches by 48 inches.
   4. Thickness: Board thickness shall be 2 1/2 inches maximum at non-tapered and tapered panel locations indicated

2.7 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
   1. Modified asphaltic, asbestos-free, cold-applied adhesive.
   2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
   3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
   1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
   3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
   1. Submit test result within 24 hours of performing tests.
      a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

D. Install sound-absorbing insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 INSTALLATION OF ROOFING, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

3.4 INSTALLATION OF INSULATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Metal Decking:
   1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows, end joints staggered not less than 12 inches in adjacent rows, and with long joints continuous at right angle to flutes of decking.
      a. Locate end joints over crests of decking.
      b. Where installing composite and non-composite insulation in two or more layers, install non-composite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
      c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
      d. Make joints between adjacent insulation boards not more than 1/4 inch width.
      e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
         1) Trim insulation so that water flow is unrestricted.
      f. Fill gaps exceeding 1/4 inch with insulation.
      g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
      h. Loosely lay each layer of insulation units over substrate.

i. Where mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
   1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
   2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
   a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
   b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
   c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
   e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
   f. Trim insulation so that water flow is unrestricted.
   g. Fill gaps exceeding 1/4 inch with insulation.
   h. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
   i. Loosely lay each layer of insulation units over substrate.
   j. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
      1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
      2) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
      3) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.5 INSTALLATION OF ADHERED ROOF MEMBRANE

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll membrane roof membrane and allow to relax before installing.

C. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

D. Accurately align roof membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

F. Apply roof membrane with side laps shingled with slope of roof deck where possible.

G. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement.
1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
2. Apply lap sealant and seal exposed edges of roofing terminations.
3. Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.

H. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.
1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
2. Apply lap sealant and seal exposed edges of roofing terminations.

I. Factory-Applied Seam Tape Installation: Clean and prime surface to receive tape.
1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
2. Apply lap sealant and seal exposed edges of roofing terminations.

J. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

K. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

L. Adhere protection sheet over roof membrane at locations indicated.

3.6 INSTALLATION OF BASE FLASHING

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 FIELD QUALITY CONTROL

A. Manufacturer's Roofing Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation periodically and on completion and submit reports of same to Architect.
   1. Notify Architect 48 hours in advance of the dates and times of inspections.

B. Demonstrate adhesion of the membrane to the insulation below by applying the minimum recommended uplift force for 5 seconds to an area selected at random by the Architect. An optional method of verifying membrane adhesion is to have the manufacturer's technical representative forcefully drag the bottom of their foot across a 12-inch path on the membrane, with any portion becoming unadhered or bubbling up considered a failure.
   1. Provide scale, devices, temporary adhesive, etc. as required.
   2. If those areas fail, the entire area shall be classified as failed.
   3. All membrane areas which fail shall be re-adhered as recommended by the manufacturer.

C. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.

D. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.

E. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.9 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
1. Owner: Valley Central School District
2. Address: 944 State Route 17K, Montgomery, NY 12549
3. Building Name/Type: School Name Varies
4. Address: Address/Location Varies
5. Area of Work: See Drawings
6. Acceptance Date: TBD
7. Warranty Period: As Specified
8. Expiration Date: As Specified

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
a. lightning;
b. peak gust wind speed exceeding 100 mph;
c. fire;
d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
f. vapor condensation on bottom of roofing; and

g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075323

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SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manufactured sheet metal items, including flashings and counterflashings.

B. Sealants for joints within sheet metal fabrications.

1.2 RELATED REQUIREMENTS

A. Section 042000 - Unit Masonry: Metal flashings embedded in masonry.

B. Section 061000 - Rough Carpentry: Wood nailers for sheet metal work.

C. Section 077100 - Roof Specialties: Manufactured copings, flashings, and expansion joint covers.

D. Section 077200 - Roof Accessories: Manufactured metal roof curbs.

E. Section 079200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.3 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2021, with Errata (2022).

D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020, with Errata (2022).

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

F. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

G. ASTM B32 - Standard Specification for Solder Metal; 2020.

H. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction; 2022.

I. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

J. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2022.

K. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2020.

L. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

M. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.

N. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2015a (Reapproved 2021).

O. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2024).

P. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).

Q. CDA A4050 - Copper in Architecture - Handbook; current edition.

R. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 SUBMITTALS

A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

B. Samples: Submit samples, illustrating metal finish color.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

C. Sample Warranty: For special warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

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 MANUFACTURERS

A. Sheet Metal Flashing and Trim Manufacturers:
   1. ALUCOBOND USA: www.alucobondusa.com/#sle.
   2. Fairview Architectural LLC: www.fairview-na.com/#sle.
   3. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
   4. Petersen Aluminum Corporation: www.pac-clad.com/#sle.
   5. Tamlyn: www.tamlyn.com/#sle.
   6. Substitutions: See Section 016000 - Product Requirements.

2.2 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal, shop pre-coated with PVDF coating.
   1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As selected by Architect from manufacturer's standard colors.

B. Anodized Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 20 gauge, 0.032 inch thick; clear anodized finish.
   1. Clear Anodized Finish: AAMA 611, AA-M12C22A41, Class I, clear anodic coating not less than 0.7 mil, 0.0007 inch thick.

2. Color Anodized Finish: AAMA 611, AA-M12C22A42/44, Class I, integrally or electrolytically colored anodic coating not less than 0.7 mil, 0.0007 inch thick.
   a. Color: As selected by Architect from manufacturer's standard colors.

2.3 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.4 EXTERIOR PENETRATION FLASHING PANELS

A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.5 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Slip Sheet: Rosin sized building paper.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

F. Reglets: Surface-mounted type, galvanized steel; face and ends covered with plastic tape.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

3.3 INSTALLATION

A. Per 2020 Building Code of New York State Section 1504.5, low-slope built-up, modified bitumen, and single-ply roof system metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 of the 2020 Building Code of New York State and tested for resistance in accordance with Test Methods RE-1, RE-2, and RE-3 of ANSI/SPRI ES-1.

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 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.
   2. Use lapped expansion joints only where indicated on Drawings.

D. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
   1. Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

E. Apply plastic cement compound between metal flashings and felt flashings.

F. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

G. Exterior Flashing Receivers: Install in accordance with manufacturer's recommendations, and in proper relationship with adjacent construction, and as follows:
   1. Secure receiver at perimeter of wall opening with adhesives or fasteners.
   2. Place flashing into receiver channel.
   3. Secure flashing with receiver clip.

H. Seal metal joints watertight.

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 076200

SECTION 077100 - ROOF SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manufactured roof specialties, including copings, fascias, and gravel stops.

1.2 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2021, with Errata (2022).

D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020, with Errata (2022).

E. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

I. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).

J. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

K. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

L. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

M. NRCA (RM) - The NRCA Roofing Manual; 2025.

N. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
   2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
   3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.4 SUBMITTALS

A. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

B. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

C. Samples: Submit appropriately sized samples of coping, gravel stop, and fascia.

D. Product Certificates: For each type of roof specialty.

E. Product Test Reports: For copings and roof-edge flashings, for tests performed by a qualified testing agency.

F. Sample Warranty: For manufacturer's special warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are SPRI ES-1 tested to specified design pressure.

B. Retain "Source Limitations" Paragraph below if required for Project. Coordinate with "Warranty" Article of this Section and requirements of Project roofing-membrane Section.

C. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section 075300.

1.6 WARRANTY

A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 075300.

B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Fluoropolymer 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 MANUFACTURERS

A. Roof Edge Flashings and Copings:
   1. Architectural Products Co: www.archprod.com/#sle.
   2. ATAS International, Inc: www.atas.com/#sle.
   3. Drexel Metals Inc: www.drexmet.com/#sle.
   4. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
   5. Metal-Era Inc: www.metalera.com/#sle.
   6. Substitutions: See Section 016000 - Product Requirements.

2.2 COMPONENTS

A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
   1. Configuration: Fascia, cant, and edge securement for roof membrane.
   2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.
      a. Design Pressure: Extended peak gust wind speed 90 MPH.
   3. Exposed Face Height: As required to conceal wood blocking/nailers.
   4. Material: Formed aluminum sheet, 0.040 inch thick, minimum.
   5. Surface: Smooth, flat finish.

6. Corners: Factory mitered and continuously welded.
7. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
8. Receiver: Extruded aluminum, 0.080 inch thick.
9. Finish: Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
10. Finish: Anodized bronze and natural (clear) .
11. Color: As selected by Architect from manufacturer's standard range.

B. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness, and finish as cap; concealed stainless steel fasteners.
2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
3. Outside Face Height: As required to conceal wood blocking/nailers.
4. Inside Face Height: As required to conceal wood blocking/nailers.
5. Material: Formed aluminum sheet, 0.040 inch thick, minimum.
6. Finish: 70 percent polyvinylidene fluoride.
7. Finish: Anodized natural (clear).
8. Color: As selected by Architect from manufacturer's standard range.

2.3 FINISHES

A. Clear Anodized Finish: AAMA 611 AA-M12C22A41 Class I clear anodic coating not less than 0.7 mil, 0.0007 inch thick.

B. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mil, 0.0007 inch thick.

C. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

2.4 ACCESSORIES

A. Sealant for Joints in Linear Components: As recommended by component manufacturer.

B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.2 INSTALLATION

A. Install components in accordance with manufacturer's instructions.

B. Seal joints within components when required by component manufacturer.

C. Anchor components securely.

D. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

E. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

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SECTION 077200 - ROOF ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Roof curbs.

1.3 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof accessories.
   1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant and field assembled work.

C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
   1. Size and location of roof accessories specified in this Section.
   2. Method of attaching roof accessories to roof or building structure.

3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
4. Required clearances.

B. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

2.2 ROOF CURBS

A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, straight sides, and integrally formed deck-mounting flange at perimeter bottom.
1. Basis of Design Product: Subject to compliance with requirements, provide Roof Curb Systems Standard Fan Curb or comparable product by one of the following:
a. Conn-Fab Sales, Inc.
b. LM Curbs.
c. Roof Products, Inc.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.

C. Material: Zinc-coated (galvanized) steel sheet, 0.052 inch (1.32 mm) thick.
1. Finish: Mill phosphatized.

D. Construction:
1. Curb Profile: Manufacturer's standard compatible with roofing system.
2. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
3. Fabricate curbs to minimum height of 24 inches (305 mm) above roofing surface unless otherwise indicated.

4. Top Surface: Level top of curb, with roof slope accommodated by sloping deck-mounting flange or by use of leveler frame.
5. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.
6. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.
7. Liner: Same material as curb, of manufacturer's standard thickness and finish.
8. Nailer: Factory-installed wood nailer along top flange of curb, continuous around curb perimeter.
9. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb, of size and spacing required to meet wind uplift requirements.
10. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch (19-mm) thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
11. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as curb.

2.3 METAL MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.
   1. Mill-Phosphatized Finish: Manufacturer's standard for field painting.
   2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm.)
   3. Exposed Coil-Coated Finish: Pre-painted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
   4. Concealed Finish: Pre-treat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm.)

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Glass-Fiber Board Insulation: ASTM C 726, nominal density of 3 lb/cu. ft. (48 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C), thickness as indicated.

C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

F. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof accessories.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.
   1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
   2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
   3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
   4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
   1. Coat concealed side of uncoated aluminum and stainless-steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
   2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
   3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

C. Roof Curb Installation: Install each roof curb so top surface is level.

D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.

E. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.

B. Touch up factory-primed surfaces with compatible primer ready for field painting, coordinate primer with architect.

C. Clean exposed surfaces according to manufacturer's written instructions.

D. Clean off excess sealants.

E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

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SECTION 078123 - INTUMESCENT FIRE PROTECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thin-film intumescent fire protection.

1.2 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

D. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

E. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

F. FM (AG) - FM Approval Guide; current edition.

G. ITS (DIR) - Directory of Listed Products; Current Edition.

H. SSPC-PA 2 - Procedure for Determining Conformance to Dry Coating Thickness Requirements; 2022.

I. UL (FRD) - Fire Resistance Directory; Current Edition.

J. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

1.3 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittals procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Performance characteristics and test results.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.

C. Certificates: Certify that intumescent fireproofing provided for this project meets or exceeds specified requirements in all respects.

D. Test Reports: Published fire resistive designs for structural elements of the types required for the project, indicating hourly ratings of each assembly.

E. Field Quality Control Submittals: Submit field test report.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company that specializes in manufacturing the type of products specified, with minimum of ten years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Deliver materials in manufacturer’s original, unopened containers with identification labels and testing agency markings intact and legible.

C. Store products in manufacturer's unopened packaging until ready for installation.
1. Store at temperatures not less than 50 degrees F in dry, protected area.
2. Protect from freezing, and do not store in direct sunlight.
3. Dispose of any materials that have come into contact with contaminants of any kind prior to application.

D. Dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 FIELD CONDITIONS

A. Protect areas of application from windblown dust and rain.

B. Maintain ambient field conditions, such as temperature, humidity, and ventilation, within limits recommended by manufacturer for optimum results. Do not install products under ambient conditions outside manufacturer's absolute limits.
1. Provide temporary enclosures as required to control ambient conditions.
2. Do not apply intumescent fireproofing when ambient temperatures are below 50 degrees F without specific approval from manufacturer.

3. Ensure that relative humidity is between 40 and 60 percent in areas of application.
4. Provide ventilation in enclosed spaces during application and for not less than 72 hours afterward.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Intumescent Thin-Film Fire Protection for Metal:
1. Albi Protective Coatings, a subsidiary of StanChem Polymers: www.albi.com/#sle.
2. Contego International, Inc: www.contegointernational.com/#sle.
3. FlameOFF Coatings, Inc: www.flameoffcoatings.com/#sle.
4. Hilti, Inc: www.hilti.com/#sle.
5. International Coatings Group: www.internationalcoatingsgroup.com/#sle.
6. Isolatek International Corp: www.isolatek.com/#sle.
7. Quantum Chemical: www.quantumchemical.com/#sle.
8. Shield Industries, Inc: www.shieldindustries.com/#sle.
9. Substitutions: See Section 016000 - Product Requirements.

2.2 SYSTEM REQUIREMENTS

A. Fireproofing: Provide intumescent thin-film fire protection systems tested by an independent testing agency in accordance with ASTM E119 and acceptable to authorities having jurisdiction (AHJ).
1. Provide assemblies listed by FM (AG) or UL (FRD) and bearing listing agency label or mark.

B. Structural Steel Beams: Fire resistance rating of 1 hour.

C. Exposed Interior Structural Steel Surfaces: Class A, flame spread index (FSI) and smoke developed index (SDI) of 25/450, maximum, when tested in accordance ASTM E84; fire resistance rating of 1 hour.

2.3 MATERIALS

A. Fire Resistive Coating System: Thin-film intumescent fire protection system for structural steel.
1. Surface Burning Characteristics: Class A, flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
2. For Interior Use:
a. Use only water-based products.
b. Use only products without fiber content.

c. VOC Content: Less than 500 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
d. Bond Strength: 631 psi, minimum.
e. Durometer Hardness, Type D: 65, minimum, in accordance with ASTM D2240.

B. Sealers and Primer: As required by tested and listed assemblies, and recommended by fireproofing manufacturer to suit specific substrate conditions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates to determine if they are in satisfactory condition to receive intumescent fire protection; verify that substrates are clean and free of oil, grease, incompatible primers, or other foreign substances capable of impairing bond to fireproofing system.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Thoroughly clean surfaces to receive fireproofing.

B. Repair substrates to remove surface imperfections that could effect uniformity of texture and thickness of fireproofing system, and remove minor projections and fill voids that could telegraph through finished work.

C. Cover or otherwise protect other work that might be damaged by fallout or overspray of fireproofing system, and provide temporary enclosures as necessary to confine operations and maintain required ambient field conditions.

3.3 APPLICATION

A. Comply with manufacturer's instructions for each particular intumescent fire protection system installation application as indicated.

B. Apply manufacturer’s recommended primer to required coating thickness.

C. Apply fireproofing to full thickness over entire area of each substrate to be protected.

D. Apply coats at manufacturer’s recommended rate to achieve dry film thickness (DFT) as required for fire resistance ratings designated for each condition.

E. Apply intumescent fire protection by spraying to maximum extent possible, and as necessary complete coverage by roller application or other method acceptable to manufacturer.

3.4 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 014000 - Quality Requirements.
   1. Arrange for testing of installed intumescent fire protection by an independent testing laboratory using magnetic pull-off dry film thickness gauge in accordance with SSPC-PA 2, and ensure it meets requirements of authorities having jurisdiction (AHJ).
   2. Submit field test reports promptly to Architect.

B. Repair or replace intumescent fire protection at locations where test results indicate fireproofing does not meet specified requirements.

3.5 CLEANING

A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

B. Immediately after installation of fireproofing in each area, remove overspray and fallout from other surfaces and clean soiled areas.

3.6 PROTECTION

A. Protect installed intumescent fire protection from damage due to subsequent construction activities, so fireproofing is without damage or deterioration before Date of Substantial Completion.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 078123

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SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions of the Contract for Construction and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Penetrations in fire-resistance-rated walls.
   2. Penetrations in horizontal assemblies.
   3. Penetrations in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: For each penetration firestopping system. Include location and design designation of each type of firestopping system.
   1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
   1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
   2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
      a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
      b. Classification markings on penetration firestopping correspond to designations listed by the following:
         1) UL in its "Fire Resistance Directory."
         2) Intertek ETL SEMKO in its "Directory of Listed Building Products."

C. Pre-installation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Grace Construction Products.
   2. Hilti, Inc.
   3. Johns Manville.
   4. Nelson Firestop Products.
   5. Specified Technologies Inc.
   6. 3M Fire Protection Products.
   7. Tremco, Inc.; Tremco Fire Protection Systems Group.
   8. USG Corporation.

2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist 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.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01 inch wg (2.49 Pa).
   1. Fire-resistance-rated walls include fire walls fire-barrier walls smoke-barrier walls and fire partitions.
   2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01 inch wg (2.49 Pa).
   1. Horizontal assemblies include floors and floor/ceiling assemblies.
   2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
   3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
   1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at 0.30 inch wg (74.7 Pa) at both ambient and elevated temperatures.

E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

F. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

G. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

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 manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
1. Permanent forming/damming/backing materials, including the following:
   a. Slag-wool-fiber or rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.
   d. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel 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 metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

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 non-shrinking, homogeneous mortar.

H. 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.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
   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.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping 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: Clean out openings immediately before installing penetration firestopping 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.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: 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.

C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping 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 fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
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. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - 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. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

B. Proceed with enclosing penetration firestopping 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 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 is 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 and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Firestopping with No Penetrating Items FS-1.1 (1hr rated penetration):
   1. UL-Classified Systems:
      a. C-AJ-(0001-0999) or F-A-(0001-0999): Concrete Floors 5" thick and less.
      b. C-BJ-(0001-0999) or F-B-(0001-0999): Concrete Floors thicker than 5".
      c. F-C-(0001-0999): Framed Floors.
      d. C-AJ-(0001-0999) C-BJ-(0001-0999),or W-J-(0001-0999): Concrete/Masonry walls 8" thick or less.
      e. W-L-(0001-0999): Framed Walls.
   2. F-Rating: 1 hour.
   3. T-Rating: 1 hour.
   4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).

5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

C. Firestopping for Metallic Pipes, Conduit, or Tubing FS-2.1 (1hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(1001-1999) or F-A-(1001-1999): Concrete Floors 5″ thick and less.
   b. C-BJ-(1001-1999), C-BK-(1001-1999), or F-B-(1001-1999): Concrete Floors thicker than 5″.
   c. F-C-(1001-1999): Framed Floors.
   d. C-AJ-(1001-1999), C-BJ-(1001-1999) or W-J (1001-1999): Concrete/Masonry walls 8″ thick or less.
   e. C-BK-(1001-1999) or W-K-(1001-1999): Concrete/Masonry walls thicker than 8″.
   f. W-L-(1001-1999): Framed Walls.
2. F-Rating: 1 hour.
3. T-Rating: 1 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

D. Firestopping for Nonmetallic Pipe, Conduit, or Tubing FS-3.1 (1hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(2001-2999) or F-A (2001-2999): Concrete Floors 5″ thick and less.
   b. C-BJ-(2001-2999), C-BK (2001-2999) or F-B (2001-2999): Concrete Floors thicker than 5″.
   c. F-C (2001-2999): Framed Floors.
   d. C-AJ (2001-2999), C-BJ (2001-1999) or W-J (2001-2999): Concrete/Masonry walls 8″ thick or less.
   e. C-BK (2001-2999) or W-K (2001-2999): Concrete/Masonry walls thicker than 8″.
   f. W-L (2001-2999): Framed Walls.
2. F-Rating: 1 hour.
3. T-Rating: 1 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

E. Firestopping for Electrical Cables FS-4.1 (1hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(3001-3999) or F-A-(3001-3999): Concrete Floors 5″ thick and less.

b. C-BJ-(3001-3999), C-BK-(3001-3999) or F-B-(3001-3999): Concrete Floors thicker than 5″.
c. F-C-(3001-3999): Framed Floors.
d. C-AJ-(3001-3999) C-BJ-(3001-3999) or W-J-(3001-3999): Concrete/Masonry walls 8″ thick or less.
e. C-BK-(3001-3999) or W-K-(3001-3999): Concrete/Masonry walls thicker than 8″.
f. W-L-(3001-2999): Framed Walls.

2. F-Rating: 1 hour.
3. T-Rating: 1 hour.
4. L-Rating at Ambient: Less than 4.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

F. Firestopping for Cable Trays with Electric Cables FS-5.1 (1hr rated penetration):
1. UL-Classified Systems:
a. C-AJ-(4001-4999) or F-A-(4001-4999): Concrete Floors 5″ thick and less.
b. C-BJ-(4001-4999), C-BK-(4001-4999) or F-B-(4001-4999): Concrete Floors thicker than 5.″
c. C-AJ-(4001-4999) C-BJ-(4001-4999) or W-J-(4001-4999): Concrete/Masonry walls 8″ thick or less.
d. C-BK-(4001-4999) or W-K-(4001-4999): Concrete/Masonry walls thicker than 8″.
e. W-L-(4001-4999): Framed Walls.
2. F-Rating: 1 hour.
3. T-Rating: 1 hour.
4. L-Rating at Ambient: Less than 5.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 2.0 cfm/sq. ft. (cu. m/s per sq. m).
6. Type of Fill Materials: As required to achieve rating.

G. Firestopping for Insulated Pipes FS-6.1 (1hr rated penetration):
1. UL-Classified Systems:
a. C-AJ-(5001-5999) or F-A-(5001-5999): Concrete Floors 5″ thick and less.
b. C-BJ-(5001-5999) C-BK-(5001-5999) or F-B-(5001-5999): Concrete Floors thicker than 5.″
c. F-C-(5001-5999): Framed Floors.
d. C-AJ-(5001-5999) C-BJ-(5001-5999) or W-J-(5001-5999): Concrete/Masonry walls 8″ thick or less.
e. C-BK-(5001-5999): Concrete/Masonry walls thicker than 8″.
f. W-L-(5001-5999): Framed Walls.
2. F-Rating: 1 hour.
3. T-Rating: 1 hour.

4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

H. Firestopping for Miscellaneous Electrical Penetrants FS-7.1 (1hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(6001-6999) or F-A-(6001-6999): Concrete Floors 5″ thick and less.
   b. C-BJ-(6001-6999): Concrete Floors thicker than 5″.
   c. C-AJ-(6001-6999) C-BJ-(6001-6999) or W-J-(6001-6999): Concrete/Masonry walls 8″ thick or less.
   d. W-L-(6001-6999): Framed Walls.
2. F-Rating: 1 hour.
3. T-Rating: 1 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

I. Firestopping for Miscellaneous Mechanical Penetrants FS-8.1 (1hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(7001-7999) or F-A-(7001-7999): Concrete Floors 5″ thick and less.
   b. C-BJ-(7001-7999) or F-B-(7001-7999): Concrete Floors thicker than 5″.
   c. F-C-(7001-7999): Framed Floors.
   d. C-AJ-(7001-7999) C-BJ-(7001-7999) or W-J-(7001-7999): Concrete/Masonry walls 8″ thick or less.
   e. W-L-(7001-7999): Framed Walls.
2. F-Rating: 1 hour.
3. T-Rating: 1 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

J. Firestopping for Groupings of Penetrants FS-9.1 (1hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(8001-8999) or F-A-(8001-8999): Concrete Floors 5″ thick and less.
   b. C-BJ-(8001-8999) or F-B-(8001-8999): Concrete Floors thicker than 5″.
   c. F-C-(8001-8999): Framed Floors.
   d. C-AJ-(8001-8999) C-BJ-(8001-8999) or W-J-(8001-8999): Concrete/Masonry walls 8″ thick or less.
   e. W-L-(8001-8999): Framed Walls.
2. F-Rating: 1 hour.

3. T-Rating: 1 hour.
4. L-Rating at Ambient: Less than 14.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 14.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

K. Firestopping with No Penetrating Items FS-1.2 (2hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(0001-0999) or F-A-(0001-0999): Concrete Floors 5″ thick and less.
   b. C-BJ-(0001-0999) or F-B-(0001-0999): Concrete Floors thicker than 5″.
   c. F-C-(0001-0999): Framed Floors.
   d. C-AJ-(0001-0999) C-BJ-(0001-0999) or W-J-(0001-0999): Concrete/Masonry walls 8″ thick or less.
   e. W-L-(0001-0999): Framed Walls.
2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

L. Firestopping for Metallic Pipes, Conduit, or Tubing FS-2.2 (2hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(1001-1999) or F-A-(1001-1999): Concrete Floors 5″ thick and less.
   b. C-BJ-(1001-1999), C-BK-(1001-1999), or F-B-(1001-1999): Concrete Floors thicker than 5″.
   c. F-C-(1001-1999): Framed Floors.
   d. C-AJ-(1001-1999), C-BJ-(1001-1999) or W-J (1001-1999): Concrete/Masonry walls 8″ thick or less.
   e. C-BK-(1001-1999) or W-K-(1001-1999): Concrete/Masonry walls thicker than 8″.
   f. W-L-(1001-1999): Framed Walls.
2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

M. Firestopping for Nonmetallic Pipe, Conduit, or Tubing FS-3.2 (2hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(2001-2999) or F-A (2001-2999): Concrete Floors 5″ thick and less.

b. C-BJ-(2001-2999), C-BK (2001-2999) or F-B (2001-2999): Concrete Floors thicker than 5″.
c. F-C (2001-2999): Framed Floors.
d. C-AJ (2001-2999), C-BJ (2001-1999) or W-J (2001-2999): Concrete/Masonry walls 8″ thick or less.
e. C-BK (2001-2999) or W-K (2001-2999): Concrete/Masonry walls thicker than 8″.
f. W-L (2001-2999): Framed Walls.

2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

N. Firestopping for Electrical Cables FS-4.2 (2hr rated penetration):
1. UL-Classified Systems:
a. C-AJ-(3001-3999) or F-A-(3001-3999): Concrete Floors 5″ thick and less.
b. C-BJ-(3001-3999) C-BK-(3001-3999) or F-B-(3001-3999): Concrete Floors thicker than 5″.
c. F-C-(3001-3999): Framed Floors.
d. C-AJ-(3001-3999) C-BJ-(3001-3999) or W-J-(3001-3999): Concrete/Masonry walls 8″ thick or less.
e. C-BK-(3001-3999) or W-K-(3001-3999): Concrete/Masonry walls thicker than 8″.
f. W-L-(3001-2999): Framed Walls.
2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 4.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

O. Firestopping for Cable Trays with Electric Cables FS-5.2 (2hr rated penetration):
1. UL-Classified Systems:
a. C-AJ-(4001-4999) or F-A-(4001-4999): Concrete Floors 5″ thick and less.
b. C-BJ-(4001-4999), C-BK-(4001-4999) or F-B-(4001-4999): Concrete Floors thicker than 5.″
c. C-AJ-(4001-4999) C-BJ-(4001-4999) or W-J-(4001-4999): Concrete/Masonry walls 8″ thick or less.
d. C-BK-(4001-4999) or W-K-(4001-4999): Concrete/Masonry walls thicker than 8″.
e. W-L-(4001-4999): Framed Walls.

2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 5.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 2.0 cfm/sq. ft. (cu. m/s per sq. m).
6. Type of Fill Materials: As required to achieve rating.

P. Firestopping for Insulated Pipes FS-6.2 (2hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(5001-5999) or F-A-(5001-5999): Concrete Floors 5″ thick and less.
   b. C-BJ-(5001-5999) C-BK-(5001-5999) or F-B-(5001-5999): Concrete Floors thicker than 5″.
   c. F-C-(5001-5999): Framed Floors.
   d. C-AJ-(5001-5999) C-BJ-(5001-5999) or W-J-(5001-5999): Concrete/Masonry walls 8″ thick or less.
   e. C-BK-(5001-5999): Concrete/Masonry walls thicker than 8″.
   f. W-L-(5001-5999): Framed Walls.
2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

Q. Firestopping for Miscellaneous Electrical Penetrants FS-7.2 (2hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(6001-6999) or F-A-(6001-6999): Concrete Floors 5″ thick and less.
   b. C-BJ-(6001-6999) Concrete Floors thicker than 5″.
   c. C-AJ-(6001-6999) C-BJ-(6001-6999) or W-J-(6001-6999): Concrete/Masonry walls 8″ thick or less.
   d. W-L-(6001-6999): Framed Walls.
2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

R. Firestopping for Miscellaneous Mechanical Penetrants FS-8.2 (2hr rated penetration):
1. UL-Classified Systems:
   a. C-AJ-(7001-7999) or F-A-(7001-7999): Concrete Floors 5″ thick and less.
   b. C-BJ-(7001-7999) or F-B-(7001-7999): Concrete Floors thicker than 5″.
   c. F-C-(7001-7999): Framed Floors.

d. C-AJ-(7001-7999) C-BJ-(7001-7999) or W-J-(7001-7999): Concrete/Masonry walls 8″ thick or less.
e. W-L-(7001-7999): Framed Walls.

2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 1.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

S. Firestopping for Groupings of Penetrants FS-9.2 (2hr rated penetration):

1. UL-Classified Systems:
   a. C-AJ-(8001-8999) or F-A-(8001-8999): Concrete Floors 5″ thick and less.
   b. C-BJ-(8001-8999) or F-B-(8001-8999): Concrete Floors thicker than 5″.
   c. F-C-(8001-8999): Framed Floors.
   d. C-AJ-(8001-8999) C-BJ-(8001-8999) or W-J-(8001-8999): Concrete/Masonry walls 8″ thick or less.
   e. W-L-(8001-8999): Framed Walls.
2. F-Rating: 2 hour.
3. T-Rating: 2 hour.
4. L-Rating at Ambient: Less than 14.0 cfm/sq. ft. (cu. m/s per sq. m).
5. L-Rating at 400 deg F (204 deg C): Less than 14.0 cfm/sq. ft. (cu. m/s per sq. m).
6. W-Rating: No leakage of water at completion of water leakage testing.
7. Type of Fill Materials: As required to achieve rating.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Silicone joint sealants.
   2. Urethane joint sealants.
   3. Latex joint sealants.
   4. Preformed joint sealants.
   5. Acoustical joint sealants.

B. Related Sections:
   1. Division 04 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
   2. Division 07 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
   3. Division 08 Section "Glazing" for glazing sealants.
   4. Division 09 Section "Gypsum Board" for sealing perimeter joints.
   5. Division 09 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters with acoustical sealant.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
   1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
   2. Submit not fewer than eight pieces of each kind of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
   3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, 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 application indicated below:
   a. Each kind of sealant and joint substrate indicated.
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 according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
      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.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind 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.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

E. Qualification Data: For qualified Installer and testing agency.

F. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

H. Preconstruction Compatibility and Adhesion Test Reports: 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 needed for adhesion.

I. 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.

J. Field-Adhesion Test Reports: For each sealant application tested.

K. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.
1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

E. Pre-installation Conference: Conduct conference at Project site.

1.6 PROJECT 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: Manufacturer's standard form in which 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 warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from natural 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 MATERIALS, 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 of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
   1. Architectural Sealants: 250 g/L.
   2. Sealant Primers for Nonporous Substrates: 250 g/L.
   3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
   1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food; provide products that comply with 21 CFR 177.2600.

F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Dow Corning Corporation; 790.
      b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
      c. Pecora Corporation; 890 NST.
      d. Sika Corporation, Construction Products Division; SikaSil-C990.
      e. Tremco Incorporated; Spectrem 1.

B. Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.
   1. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Dow Corning Corporation; 790.
      b. Pecora Corporation; 301 NS.
      c. Tremco Incorporated; Spectrem 800.

C. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. BASF Building Systems; Omniplus.
      b. Dow Corning Corporation; 786 Mildew Resistant.

c. GE Advanced Materials - Silicones; Sanitary SCS1700.
d. May National Associates, Inc.; Bondaflex Sil 100 WF.
e. Tremco Incorporated; Tremsil 200 Sanitary.

2.3 URETHANE JOINT SEALANTS

A. Immersible, Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Uses T and I.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. BASF Building Systems; Sonolastic NP1.
b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
c. Tremco Incorporated; Vulkem 116.

2.4 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. BASF Building Systems; Sonolac.
b. Bostik, Inc.; Chem-Calk 600.
c. Pecora Corporation; AC-20+.
d. Schnee-Morehead, Inc.; SM 8200.
e. Tremco Incorporated; Tremflex 834.

2.5 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Pecora Corporation; AIS-919.
b. USG Corporation; SHEETROCK Acoustical Sealant.

2.6 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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.
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 C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind 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 per Figure 8A in ASTM C 1193, unless otherwise indicated.
      a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
   1. Extent of Testing: Test completed and cured sealant joints as follows:
      a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
      b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.
   2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
      a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
   3. Inspect tested joints and report on the following:
      a. Whether sealants filled joint cavities and are free of voids.

b. Whether sealant dimensions and configurations comply with specified requirements.
c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
1. Joint Locations:
a. Isolation and contraction joints in cast-in-place concrete slabs.
b. Tile control and expansion joints.
c. Joints between different materials listed above.
d. Other joints as indicated.

2. Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Construction joints in cast-in-place concrete.
      b. Control and expansion joints in unit masonry.
      c. Joints in glass unit masonry assemblies.
      d. Joints between metal panels.
      e. Joints between different materials listed above.
      f. Perimeter joints between materials listed above and frames of doors windows and louvers.
      g. Control and expansion joints in ceilings and other overhead surfaces.
      h. Other joints as indicated.
   2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
   1. Joint Locations:
      a. Isolation joints in cast-in-place concrete slabs.
      b. Control and expansion joints in tile flooring.
      c. Other joints as indicated.
   2. Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Locations:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Perimeter joints of exterior openings where indicated.
      c. Tile control and expansion joints.
      d. Vertical joints on exposed surfaces of interior unit masonry concrete walls and partitions.
      e. Perimeter joints between interior wall surfaces and frames of interior doors windows.
      f. Other joints as indicated.
   2. Joint Sealant: Latex.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Sealant Location:
      a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
      b. Tile control and expansion joints where indicated.
      c. Other joints as indicated.
   2. Joint Sealant: [Single component, nonsag, mildew resistant, acid curing.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
   1. Joint Location:
      a. Acoustical joints where indicated.
      b. Other joints as indicated.
   2. Joint Sealant: Acoustical.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
   1. Interior standard steel doors and frames.
   2. Exterior standard steel doors and frames.

B. Related Requirements:
   1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

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 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Samples for Initial Selection: For hollow-metal doors and frames with factory-applied color finishes.

D. Samples for Verification:
1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
2. Fabrication: Prepare Samples approximately 12 by 12 inches 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.

E. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For door inspector.
1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
3. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

B. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.

C. Field quality control reports.

1.7 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.8 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:
   1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

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. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
   1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from an SDI Certified manufacturer:
   1. CECO Door Products.
   2. Curries Company.
   3. Steelcraft.

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.

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.

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.
      c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch.
      d. Edge Construction: Model 1, Full Flush.
      e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
      f. Core: Polystyrene, Polyurethane, or Polyisocyanurate.
      g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated doors.
   2. Frames:
      a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch.
      b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
      c. Construction: Fully welded.
   3. Exposed Finish: Painted

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.
      c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch with A60 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 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. Core: Vertical steel stiffener.
   2. Frames:
      a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch with A60 coating.
      b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
      c. Construction: Fully welded.
   3. Exposed Finish: Painted.

2.5 BORROWED LITES

A. Fabricate of uncoated steel sheet for interior locations and metallic-coated steel sheet for exterior locations, minimum thickness of 0.053 inch.

B. Construction: Fully welded.

C. 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.

D. 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 of frame height above 7 feet.
3. Post-installed Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.7 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

E. 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.

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 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, or by rigid mechanical anchors.
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 A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with beveld stops unless otherwise indicated.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.9 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.

B. Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with ANSI/SDI A250.3.
   1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.10 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.

2.11 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. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
   6. 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.
   7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
      a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.
3. Smoke-Control Doors: Install doors in accordance with NFPA 105.

2.12 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.
2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

2.13 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.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 081116 - ALUMINUM FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum frames.

1.2 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealing joints between door frames and adjacent construction.

B. Section 087100 - Door Hardware: Hardware for aluminum doors.

C. Section 088000 - Glazing: Glazing materials for aluminum doors and frames.

1.3 REFERENCE STANDARDS

A. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products; 2021.

B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

D. AAMA 701/702 - Performance Specification for Pile Weatherstrips (AAMA 701) and Polymer Weatherseals (AAMA 702); 2023.

E. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

F. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

G. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2021, with Errata (2022).

H. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020, with Errata (2022).

I. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

J. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

K. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

M. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

N. ASTM C365/C365M - Standard Test Method for Flatwise Compressive Properties of Sandwich Cores; 2022.

O. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2019.

P. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).

Q. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.

R. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2022.

S. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.

T. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

U. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

V. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

W. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

X. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).

Y. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.

Z. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2020.

AA. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2019c.

BB. FLA (FBC-B) - Florida Building Code: Building (8th Edition); 2023, with Supplement (2024).

CC. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

DD. ITS (DIR) - Directory of Listed Products; Current Edition.

EE. Miami (APD) - Approved Products Directory; Miami-Dade County; Current Edition.

FF. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

GG. UL (DIR) - Online Certifications Directory; Current Edition.

HH. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's descriptive literature for each type of frame; include information on fabrication methods.

C. Shop Drawings: Include elevations of each opening type.
1. Verify dimensions by field measurements before fabrication and indicate on shop drawings.

D. Selection Samples: Complete set of color and finish options, using actual materials, for Architect's selection.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum components in manufacturer's standard protective packaging, palleted, crated, or banded together.

B. Inspect delivered components for damage and replace. Repaired components will not be accepted.

C. Store components in clean, dry, indoor area, under cover in manufacturer's packaging until installation.

D. Protect materials and finish from damage during handling and installation.

1.7 FIELD CONDITIONS

A. Do not begin installation of interior aluminum components until space has been enclosed and ambient thermal conditions are being maintained at levels consistent with final project requirements.

1.8 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Manufacturer Warranty: Provide 10-year manufacturer warranty for defects in workmanship and materials. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Aluminum Frames:
1. Arcadia, Inc: www.arcadiainc.com/#sle.
2. Avalon International Aluminum LLC: www.avalonint.com/#sle.
3. Cline Aluminum Doors, Inc: www.clinedoors.com/#sle.
4. Special-Lite: www.special-lite.com/
5. Substitutions: See Section 016000 - Product Requirements.

2.2 FRAMES

A. Accessibility: Comply with ICC A117.1 and ADA Standards.

B. Aluminum Frames for Doors, Sidelights, or Transoms: Extruded aluminum, thermally broken hollow or C-shaped sections; no steel components.

1. Frame Depth: 4-1/4 inches minimum
2. Finish: Selected by Architect from manufacturer's full range of finishes and colors.
3. Weatherstripping: Replaceable pile type; at jambs and head.
4. Sidelight/Transom Glazing: See Section 088000.

2.3 COMPONENTS

A. Frames: Extruded aluminum shapes, not less than 0.062 inch thick, reinforced at hinge and strike locations.
   1. Corner Brackets: Extruded aluminum, fastened with stainless steel screws.
   2. Trim: Extruded aluminum, not less than 0.062 inch thick, removable snap-in type without exposed fasteners.
   3. Cove Moulding: For historic doors, where indicated on drawings, provide aluminum frame manufacturer's standard two-piece, screw applied, aluminum brick mounting around entire frame, exterior and interior. Color and finish to be selected by Architect from full range.

2.4 MATERIALS

A. Aluminum Sheet: ASTM B209/B209M, alloy 5005, temper H14, stretcher leveled.

B. Extruded Aluminum: ASTM B221 (ASTM B221M), alloy 6063, temper T5, or alloy 6463, temper T5.

2.5 FINISHES

A. Class I Natural Anodized Finish: Clear anodic coating; AAMA 611 AA-M12C22A41, minimum dry film thickness (DFT) of 0.7 mils, 0.0007 inch.

B. Class II Natural Anodized Finish: Clear anodic coating; AAMA 611 AA-M12C22A31, minimum dry film thickness (DFT) of 0.4 mil, 0.0004 inch.

C. Class I Color Anodized Finish: Electrolytically deposited colored anodic coating; AAMA 611 AA-M12C22A44, minimum dry film thickness (DFT) of 0.7 mils, 0.0007 inch.

D. Class II Color Anodized Finish: Electrolytically deposited colored anodic coating; AAMA 611 AA-M12C22A34, minimum dry film thickness (DFT) of 0.4 mil, 0.0004 inch.

E. Pigmented Organic Coatings: Polyester or acrylic baked enamel finish with minimum dry film thickness (DFT) of 0.8 mils, 0.0008 inch over aluminum extrusions and panels; AAMA 2603.

F. High Performance Organic Coatings: Multiple coats, thermally cured fluoropolymer system with minimum dry film thickness (DFT) of 1.2 mils, 0.0012 inch over aluminum extrusions and panels; AAMA 2604.

G. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.6 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.

B. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible, otherwise, non-magnetic stainless steel or steel hot-dip galvanized in compliance with ASTM A123/A123M.

C. Bituminous Coating: Cold-applied asphaltic mastic, compounded for 30-mil thickness per coat.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that wall surfaces and openings are ready to receive frames and are within tolerances specified in manufacturer's instructions.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Perform cutting, fitting, forming, drilling, and grinding of frames as required for project conditions.

B. Replace components with damage to exposed finishes.

C. Separate dissimilar metals to prevent electrolytic action between metals.

3.3 INSTALLATION

A. Install frames in accordance with manufacturer's instructions and approved shop drawings.

B. Install exterior frames in accordance with ASTM E2112.

C. Set frames plumb, square, level, and aligned to receive doors. Anchor frames to adjacent construction in strict accordance with manufacturer's recommendations and within specified tolerances.

D. Where aluminum surfaces contact metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact by painting dissimilar metal with heavy coating of bituminous paint.

E. Install door hardware. See Section 087100.

F. Install glazing; set glazing stops and glazing gaskets flush with face of door or frame.

G. Comply with glazing installation requirements. See Section 088000.

3.4 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

3.5 CLEANING

A. Upon completion of installation, thoroughly clean door and frame surfaces in accordance with AAMA 609 & 610.

B. Do not use abrasive, caustic, or acid cleaning agents.

3.6 PROTECTION

A. Protect products of this section from damage caused by subsequent construction until Date of Substantial Completion.

B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION 081116

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SECTION 081119 - STAINLESS-STEEL FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stainless-steel hollow metal frames.
   1. Non-fire-rated frames.
   2. Fire-rated frames.

1.2 RELATED REQUIREMENTS

A. Section 081733 - Fiber Reinforced Polymer Doors

B. Section 087100 - Door Hardware.

1.3 ABBREVIATIONS AND ACRONYMS

A. ANSI: American National Standards Institute.

B. ASCE: American Society of Civil Engineers.

C. ASTM International.

D. BHMA: Builders Hardware Manufacturers Association

E. FBC: Florida Building Code.

F. FEMA: Federal Emergency Management Agency.

G. HMMA: Hollow Metal Manufacturers Association.

H. ICC: International Code Council.

I. ITS: Intertek Testing Services.

J. NAAMM: National Association of Architectural Metal Manufacturers.

K. NFPA: National Fire Protection Association.

L. SDI: Steel Door Institute.

M. UL: Underwriters Laboratories.

1.4 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2018.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2023b.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

F. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.

H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

I. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

J. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation; 2022.

K. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.

L. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2020.

M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

N. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

O. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

P. ASTM E413 - Classification for Rating Sound Insulation; 2022.

Q. ASTM E1332 - Standard Classification for Rating Outdoor-Indoor Sound Attenuation; 2022.

R. ASTM F1450 - Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention and Correctional Facilities; 2012a (Reapproved 2019).

S. ASTM F2247 - Standard Test Method for Metal Doors Used in Blast Resistant Applications (Equivalent Static Load Method); 2018.

T. ASTM F2927 - Standard Test Method for Door Systems Subject to Airblast Loadings; 2021.

U. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2016.

V. FBC TAS 201 - Impact Test Procedures; Testing Application Standard; 1994.

W. FBC TAS 202 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure; Testing Application Standard; 1994.

X. FBC TAS 203 - Criteria for Testing Products Subject To Cyclic Wind Pressure Loading; Testing Application Standard; 1994.

Y. FEMA P-320 - Taking Shelter from the Storm: Building or Installing a Safe Room for Your Home; 2021.

Z. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms; 2021.

AA. FLA (PAD) - Florida Building Code Online - Product Approval Directory; Current Edition.

BB. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters; 2020.

CC. ITS (DIR) - Directory of Listed Products; Current Edition.

DD. Miami (APD) - Approved Products Directory; Miami-Dade County; Current Edition.

EE. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

FF. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

GG. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.

HH. NAAMM HMMA 850 - Fire-Rated Hollow Metal Doors and Frames; 2014.

II. NAAMM HMMA 862 - Guide Specifications for Forced Entry/Bullet Resistant (FE/BR) Security Hollow Metal Doors and Frames; 2021.

JJ. NAAMM HMMA 863 - Guide Specifications for Detention Security Hollow Metal Doors and Frames; 2014.

KK. NAAMM HMMA 865 - Guide Specifications for Sound Control Hollow Metal Door and Frames Assemblies; 2013.

LL. NAAMM HMMA 866 - Guide Specifications for Stainless Steel Hollow Metal Doors and Frames; 2012 (Reapproved 2018).

MM. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.

NN. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.

OO. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

PP. UFC 4-010-01 - DoD Minimum Antiterrorism Standards for Buildings; 2018, with Editorial Revision (2022).

QQ. UL (DIR) - Online Certifications Directory; Current Edition.

RR. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

SS. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

TT. UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.

UU. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

D. Design Submittals: Manufacturer to submit anchor design analysis calculations for blast-resistant doors signed by specialty design engineer licensed in the State in which the Project is located.

E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years documented experience.
   1. Manufacturer is a member of NAAMM-HMMA.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

C. Maintain at project site copies of reference standards relating to installation of specified products.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 in accordance with specified requirements.

B. Deliver rames palletized, packaged, or crated during transit and providing necessary protection.

C. Protect with resilient packaging; avoid humidity build-up under coverings by allowing for air circulation; prevent corrosion and adverse effects on stainless-steel finish.

D. Do not remove wraps or covers from stainless-steel frame material until ready for installation.

E. Store frame material in up-right vertical position, with wood blocking to raise above floor level and to provide separation between units.

1.8 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide manufacturer warranty for doors and frames to be free from material or workmanship defects and within commercial tolerances within a two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Stainless-Steel Frames Manufacturers:
   1. AMBICO: www.ambico.com/#sle.
   2. ASI Doors Inc: www.asidoors.com/#sle.
   3. Next Door Company: www.nextdoorco.com/#sle.
   4. Steelcraft, an Allegion brand: www.allegion.com/#sle.

5. Terra Universal, Inc: www.terrauniversal.com/#sle.

B. Substitutions: See Section 016000 - Product Requirements.

2.2 STAINLESS-STEEL FRAMES

A. Stainless-SteelFrames:
1. Based on NAAMM HMMA Custom Guidelines: Comply with guidelines of NAAMM HMMA 866 for stainless-steel hollow metal doors and frames.
a. Physical Endurance - Level A (1,000,000 cycles), in accordance with ANSI/SDI A250.4 for Swing Test.
b. Applications: Comply with designated application in accordance with NAAMM HMMA 866 guidelines.
1) Highly corrosive.
c. Frames: Stainless-steel, face welded type in compliance with NAAMM HMMA 866, with Type 316 alloy in compliance with ASTM A666.
1) Sheet Thickness: 16 gauge, 0.053 inch, minimum.

2.3 PERFORMANCE REQUIREMENTS

A. Fire-Rated Frames: Face sheets of stainless-steel.
1. Fire-Rated Testing: Comply with NAAMM HMMA 850 requirements for fire-rated doors.
2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
3. Provide units listed and labeled by UL (DIR) or ITS (DIR).
a. Attach fire rating label to each fire rated unit in compliance with requirements.

2.4 MATERIALS

A. Stainless-Steel, Type 304: Complying with ASTM A666.

B. Cold-Rolled Steel: Comply with ASTM A1008/A1008M, Commercial Steel (CS), Type B.

C. Zinc-Coated (Galvanized) Steel: Complying with ASTM A653/A653M, Commercial Steel (CS), Type B; with at least G60 or A60 metallic coatings.

D. Expanded Polystyrene (EPS) Insulation: Rigid board, with minimum density of 1.0 lb/cu ft, in accordance with ASTM C578.

E. Polyurethane Insulation: Rigid, cellular board, with minimum density of 1.8 lb/cu ft, complying with ASTM D1622, and containing no urea formaldehyde resins.

F. Faced Polyisocyanurate Insulation: Rigid, pre-formed, closed cell board, complying with ASTM C1289 (faced).

G. Unfaced Polyisocyanurate Insulation: Rigid, pre-formed, closed cell board, complying with ASTM C591 (unfaced).

H. Mineral-Fiber Insulation: Insulation consisting of rock-wool fibers, slag-wool fibers, or glass fibers as required to comply with door's designated fire-rating.

2.5 ASSEMBLY

A. Mullions for Pairs of Doors: Fixed, with profile similar to jambs.

B. Electronic Hardware: Provide grout guards, and access plates in compliance with specified requirements in accordance with NAAMM HMMA 866.

C. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.

D. Frames Wider than 48 inches: Reinforce with stainless-steel channel fitted tightly into frame head, flush with top in compliance with NAAMM HMMA 866 for application.

E. Floor and Jamb Anchors: Comply with specified requirements in compliance with NAAMM HMMA 866 for application.

F. Tolerances: Comply with manufacturing tolerances in compliance with NAAMM HMMA 866 for stainless-steel doors, frames, and hardware.

2.6 FINISHES

A. Stainless-Steel Finishes:
   1. For No.4 - Brushed satin finish, ensure the following are completed on exposed metal surfaces:
      a. Remove tool and die marks and stretch lines, or blend into finish.
      b. Provide uniform finish, grind and polish exposed surfaces and free of cross hatches.
      c. Provide surfaces that are chemically clean without any embedded foreign materials.
      d. Grain Direction: Ensure specified grain direction runs vertically on door faces and frame jambs.
   2. For No.2B - Mill finish, unpolished; surface cannot be polished or restored from fabrication marks.

2.7 ACCESSORIES

A. Grout for Frames: Provide chemical reaction type mortar grout with maximum slump of 4 inch for hand troweling in place; thinner pumpable grout is prohibited.

B. Frame Spreaders: Provide temporary frame spreaders welded or mechanically attached to base of jambs or mullions to serve as bracing during shipping and handling.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

D. Verify that finished floor area within path of door swing complies with flatness criteria and correct as necessary.

E. Verify each frame for correct size, swing, fire rating and opening number.

3.2 PREPARATION

A. Remove frame spreaders, and restore exposed finish as required to ensure repaired area is smooth, flush, and not visible on exposed faces.

B. Do not proceed with installation until support structure and substrates have been properly prepared and deviations from manufacturing tolerances are corrected; commencement of installation constitutes acceptance of conditions.

3.3 INSTALLATION

A. Install frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install prefinished frames after painting and wall finishes are complete.

C. Install fire-rated units in accordance with NFPA 80 and local authorities having jurisdiction (AHJ).

D. Coordinate frame anchor placement with wall construction.
   1. Provide anchors appropriate for substrate door frame is fastened to and conditions specified for loading on door and frame.

E. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

F. Install door hardware as specified in Section 087100.

1. Comply with recommended practice for hardware placement of stainless-steel doors and frames in accordance with NAAMM HMMA 866, NAAMM HMMA 830 and NAAMM HMMA 831.

G. Coordinate installation of electrical connections with electrical hardware items being installed on doors and/or frames.

H. Touch up damaged factory finishes.

3.4 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with NAAMM HMMA 866

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.5 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.6 CLEANING

A. Clean grout and other materials from stainless-steel doors and frames immediately after installation.

B. Touch up stainless-steel immediately after erection, smooth scratched or damaged areas and polish to match adjacent undamaged finish.

C. See Section 017419 - Construction Waste Management and Disposal for additional requirements.

END OF SECTION 081119

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SECTION 081416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Solid-core doors with wood-veneer faces.
   2. Factory finishing flush wood doors.
   3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:
   1. Section 087100 "Door Hardware" for hardware sets in flush wood doors.
   2. Section 088000 "Glazing" for glass view panels in flush wood doors.
   3. Section 088813 “Fire-Resistant Glazing” for glass view panels in flush wood doors.
   4. Section 099100 "Painting" for field finishing doors.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:
   1. Door core materials and construction.
   2. Door edge construction
   3. Door face type and characteristics.
   4. Factory finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
   1. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
   2. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
   3. Dimensions and locations of blocking for hardware attachment.
   4. Dimensions and locations of mortises and holes for hardware.

5. Clearances and undercuts.
6. Requirements for veneer matching.
7. Doors to be factory finished and application requirements.
8. Fire-protection rating for fire-rated doors.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:
1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
   a. Provide Samples for each species of veneer and solid lumber required.
   b. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.
3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer's Certification: A certification that manufacturer that has been in continuous door manufacturing for the last 10 years.

B. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies shall comply with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

C. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

1.7 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 bottom rail with opening number used on Shop Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Delamination of veneer.
      b. Warping (bow, cup, or twist) more than 1/4-inch in a 42-by-84-inch section.
      c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
   2. Warranty 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. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Algoma Hardwoods, Inc.
   2. Eggers Industries.
   3. Marshfield Door Systems, Inc.
   4. Mohawk Flush Doors, Inc.; a Masonite company.
   5. VT Industries Inc.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.

B. 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 indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
   3. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.

C. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.3 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
   1. Provide Labels indicating that doors comply with requirements of grades specified.
   2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.

2.4 SOLID-CORE FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Doors:
   1. Performance Grade: ANSI/WDMA I.S. 1A Extra Heavy Duty.
   2. Grade: Custom.
   3. Faces: Grade A.
      a. Species: Selected from manufacturer’s full range of species.
      b. Cut: Rift cut.
      c. Match between Veneer Leaves: Slip match.
      d. Assembly of Veneer Leaves on Door Faces: Running match.
   4. Exposed Vertical Edges: Applied wood edges of same species as faces and covering edges of crossbands - edge Type D.

B. Particleboard-Core Doors:
   1. Particleboard: ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde.

2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
    a. 5-inch top-rail blocking, in doors indicated to have closers.
    b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
    c. 5-inch mid-rail blocking, in doors indicated to have exit devices.

C. Mineral-Core Doors:
1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
    a. 5-inch top-rail blocking.
    b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
    c. 5-inch mid-rail blocking, in doors indicated to have armor plates.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
4. Construction: Five (5) plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.5 LIGHT FRAMES

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.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated on Drawings.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.
1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. 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 088000 "Glazing."

2.7 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.
1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Factory finish doors that are indicated on Drawings to receive transparent finish.

D. Factory finish doors where indicated in schedules or on Drawings as factory finished.

E. Transparent Finish:
1. Grade: Custom
2. Finish: ANSI/WDMA I.S. 1A TR-6 Catalyzed Polyurethane.
3. Staining: As selected by Architect from manufacturer's full range.
4. Effect: Semi-filled finish, produced by applying an additional finish coat to partially fill the wood pores.
5. Sheen: Satin.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
1. Install fire-rated doors and frames in accordance with NFPA 80.
2. Install smoke- and draft-control doors in accordance with NFPA 105.

C. Job-Fitted Doors:
1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
2. Machine doors for hardware.
3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
4. Clearances:
a. Provide 1/8-inch at heads, jambs, and between pairs of doors.
b. Provide 1/8-inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
c. Where threshold is shown or scheduled, provide 1/4-inch from bottom of door to top of threshold unless otherwise indicated.
d. Comply with NFPA 80 for fire-rated doors.
5. Bevel non-fire-rated doors 1/8-inch in 2 inches at lock and hinge edges.
6. Bevel fire-rated doors 1/8-inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Provide inspection of installed Work through AWI's Quality Certification Program, certifying that wood doors and frames, including installation, comply with requirements of AWI/AWMCA/WI's "Architectural Woodwork Standards" for the specified grade.
2. 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.

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 081416

SECTION 081733 - FIBER REINFORCED POLYMER DOORS

SEPART 1 - GENERAL

1.1 REFERENCE STANDARDS

A. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

B. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

C. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.2 SUMMARY

A. Section includes Fiberglass Reinforced Polyester (FRP) Flush Doors in Aluminum Frames, insolated panels and storefront framing.

B. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
   1. PERFORMANCE REQUIREMENTS

C. Performance Requirements for FRP Pebble Texture Flush Doors:
   1. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
   2. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.
   3. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
   4. Thermal and Humid Aging, Foam Core, Nominal Value, 158 Degrees F and 100 percent Humidity for fourteen (14) Days, ASTM D 2126: Minus 5.14 percent volume change.
   5. Air Infiltration: For single door 3′-0″ x 7′-0″, test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.
   6. Water Resistance: For single door 3′-0″ x 7′-0″, test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.
   7. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
   8. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.
   9. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.
   10. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.
   11. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.

12. Thermal Transmission, Exterior Doors, U Value, AAMA 1503-98: Maximum of 0.29BTU/hr x sf x degrees F. Minimum of 55 CRF value.
13. Insulated Foam Cores, Non-rated Swinging Doors: IBC 2603.4.1.7, Passed by independent test or meet code. Doors not required to have a fire protection rating. Where pivoted or side-hinged doors are permitted without a fire protection rating, foam plastic insulation, having a flame spread index of 75 or less and a smoke-developed index of not more than 450, shall be permitted as a core material where the door facing is of metal having a minimum thickness of 0.032-inch (0.8 mm) aluminum or steel having a base metal thickness of not less than 0.016 inch (0.4 mm) at any point.
14. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
    a. Flame Spread: Maximum of 200, Class C.
    b. Smoke Developed: Maximum of 450, Class C.
15. Surface Burning Characteristics, Class A Standard On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
    a. Flame Spread: Maximum of 25.
    b. Smoke Developed: Maximum of 450.
16. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot pounds per inch of notch.
17. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.
18. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
19. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
20. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.
21. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 5420: 120inlb.
22. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentages.
23. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data, including description of materials, components, test reports, fabrication, finishes, and installation.

B. Shop Drawings: Submit manufacturer's shop drawings, including ELEVATIONS, SECTIONS, AND DETAILS, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, and finish.

C. Samples:
    1. Door: Submit manufacturer's sample of Door showing face sheets, core, framing, and finish.

2. Color: Submit manufacturer's samples of standard colors of Doors and Frames.

D. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for Doors, including maintenance and operating instructions for hardware.

E. Warranty: Submit manufacturer's warranty as described in this specification.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: FRP Door, immediate door frame, sidelites and transoms shall be components from same manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation.

1.6 WARRANTY

A. Warrant Color throughout FRP Doors, Frames, and Factory Hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.

B. Warranty Period: Ten (10) years starting at Substantial Completion. In addition, limited lifetime warranty covering the following: failure of corner joinery, core deterioration, delamination or bubbling of door skin.

C. Factory Applied Hardware: The workmanship and materials involved with the installation of hardware by the door manufacturer is guaranteed to be free of defect for ten (10) years from the date of shipment. Door Manufacturer to install all hardware, except door closers, and warrant attachment for indicated time period. For warranty information of hardware operation refer to section 087100.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Special-Lite, Inc., Decatur, Michigan.

1. Doors for Pool, Pool Spectator Areas, Pool Maintenance Areas, Pool Mechanical/Electrical Rooms, Pool Storage Areas, Pool Locker Rooms, Pool Offices, Pool Toilet Rooms, and Misc. Pool Support Spaces:
    a. Type FRP (as indicated on Drawings): AF-100 Smooth Pultruded Fiberglass Door by Special-Lite.
2. Exterior Ballistic-Rated Doors:
    a. Type BFRP (as indicated on Drawings): AF-217BR Bullet-Resistant Pebble Grain Fiberglass Doors by Special-Lite.

2.2 FRP FLUSH DOORS

A. Construction:
1. Door Thickness: 1-3/4 inches, 1-7/8 inches at door edge because of stainless steel edge banding.
2. Stiles and Rails: Fiberglass with rabbited channel for accepting ballistic core material.
3. Corners: Mitered, chemically welded to stiles and rails.

B. Edge Channels.
1. 0.0620 inch thick, 3/4 inch leg, stainless steel edge channel.
2. Applied to entire perimeter of the door.

C. Reinforcements.
1. High-density polyurethane shapes chemically welded to stiles, rails and/or core.

D. Face Sheet for Pebble Grain Fiberglass Doors:
1. Exterior
    a. 0.1200 inch thick, pebble texture, through color with integral film FRP sheet.
2. Interior
    a. 0.1200 inch thick, pebble texture, through color with integral film FRP sheet.
3. Attachment of Face Sheet.
    a. Face sheets to be flame treated to promote durable, long-lasting bond.
    b. Face sheets adhered to stiles, rails, and core using hot melt adhesive evenly coated across all surfaces to produce strong bond and prevent moisture absorption.
4. Texture: Pebble Grain Fiberglass
5. Color: Architect to select color from full range of manufacturer’s standard colors.

E. Core:
1. Material: Sandwich panel consisting of polypropylene, fiberglass ballistic panel, and polypropylene.
2. Density: Minimum of 5 pounds per cubic foot.
3. Corrosion, fungi, rot, chemical and moisture resistant.
4. Sound and vibration dampening.

5. Energy absorbing and recyclable.

F. Cutouts:
1. Manufacture doors with cutouts for required vision lites, louvers, and panels.
2. Factory install vision lites, louvers, and panels.

G. Hardware:
1. Pre-machine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
2. Factory install hardware except closers.
3. Concealed adjustable meeting stile astragals.
4. Adjustable door bottom brushes.

H. Vision Lite: Manufactures standard vision lite.
1. Factory Glazed: As indicated in Section 088000.
2. Size: As indicated on drawings within code requirements.

2.3 ALUMINUM COMPONENTS

A. Aluminum Members: Produced from 100% reprocessed 6063-T5 alloy.
1. Extrusions: ASTM B 221.
2. Sheet and Plate: ASTM B 209.
3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.

B. Components: Door and Frame components from same manufacturer.

C. Fasteners:
1. Material: Aluminum, 18-8 stainless steel or other non-corrosive metal.
2. Compatibility: Compatible with items to be fastened.
3. Exposed Fasteners: Screws with finish matching items to be fastened.

2.4 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated.

B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.

C. Assembly:
1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
a. Remove burrs from cut edges.

D. Welding: Welding of doors or frames is not acceptable.

E. Fit:
1. Maintain continuity of line and accurate relation of planes and angles.
2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.5 ALUMINUM FRAMING SYSTEMS

A. Tubular Framing:
1. Size and Type: Supply thermally improved flush glaze system, 0.080-inch wall thickness, SL-450T-FG, 2″ x 4-1/2″ or of sized indicated.
2. Materials: Aluminum Alloy 6063-T5
3. Immediate Door Frame: Heavy wall, minimum 1/8-inch wall thickness of size required.
4. Applied Door Stops: 0.625 inch high, with screws and weather-stripping. Door stop shall incorporate pressure gasketing for weathering seal. Counterpunch fastener holes in door stop to preserve full metal thickness under fastener head. Snap on or blade stops are not acceptable. Provide 1/2″ solid aluminum bar stock behind door stop at closer shoe attachment point.
5. Frame Members: Box-type with four (4) enclosed sides. Open back framing is not acceptable.
6. Caulking: Caulk joints before assembling frame members.
7. Joints:
   a. Secure joints with fasteners.
   b. Provide hairline butt joint appearance.
8. Factory Fabrication: Factory fabricate immediate door framing to ensure proper industry clearances around doors. Use of stick material is not acceptable.
9. Applied Stops: If required for transom, and borrowed lites and panels. Applied stops shall incorporate pressure gasketing for weathering seal.
10. Hardware:
    a. Premachine and reinforce frame members for hardware in accordance with manufacturer's standards and hardware schedule.
    b. Hardware Reinforcement: Provide minimum 1/8-inch solid aluminum at all hardware attachment points.
    c. Factory install hardware.
11. Anchors:
    a. Anchors appropriate for wall conditions to anchor framing to wall materials.
    b. Door Jamb and Header Mounting Holes: Maximum of 24-inch centers.
    c. Secure head and sill members of transom, side lites, and similar conditions.
12. Side Lites:
    a. Factory-assemble side lites to greatest extent possible.
    b. Mark frame assemblies according to location.
    c. HARDWARE

B. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.

C. Factory installed hardware.

D. Hardware Schedule: As specified in Section 087100.

2.6 VISION LITES

A. Factory Glazing: 1-inch glass insulated glass for exterior doors. Fire-rated glass in rated doors. Refer to Schedule for glass types.

B. Lites in Exterior Doors: Allow for thermal expansion.

C. Rectangular Lites:
1. Size: As indicated by door types.
2. Factory-glazed with screw applied aluminum stops anodized to match perimeter Door rails.

2.7 ALUMINUM FINISHES

A. Anodized Finish: Class I finish, 0.7 mils thick.
1. Clear 215 R1, AA-M10C12C22A41, Class I, 0.7 mils thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 INSTALLATION

A. Install Doors in accordance with manufacturer's instructions.

B. Install Doors plumb, level, square, true to line, and without warp or rack.

C. Anchor frames securely in place.

D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.

E. Set thresholds in bed of mastic and back seal.

F. Install exterior Doors to be weather-tight in closed position.

G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of Doors.

3.5 ADJUSTING

A. Adjust Doors, hinges, and locksets for smooth operation without binding.

3.6 CLEANING

A. Clean Doors promptly after installation in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that damage finish.

3.7 PROTECTION

A. Protect installed doors to ensure that, except for normal weathering, Doors shall be without damage or deterioration at time of Substantial Completion.

END OF SECTION 081733

SECTION 083100 - ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall-mounted access units.

B. Ceiling-mounted access units.

1.2 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2022.

D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021a.

F. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing; 2020a.

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2021a.

H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.

I. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2018, with Editorial Revision.

J. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

K. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.

L. FM (AG) - FM Approval Guide; current edition.

M. ITS (DIR) - Directory of Listed Products; Current Edition.

N. UL (FRD) - Fire Resistance Directory; Current Edition.

1.3 SUBMITTALS

A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

B. Shop Drawings: Indicate exact position of each access door and/or panel unit.

C. Manufacturer's qualification statement.

D. Installer's qualification statement.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS ASSEMBLIES

A. Manufacturers:
1. Provide access door and panel assemblies by one of the following:
a. Babcock-Davis: www.babcockdavis.com/#sle.

b. BAUCO Access Panel Solutions Inc: www.accesspanelsolutions.com/#sle.Concealed Hardware and Gypsum Board Inlay - Regular Size: BAUCO Plus II - Access Panels.Concealed Hardware and Gypsum Board Inlay - Large Size: BAUCO XL - Access Panels.Circular with Concealed Hardware and Gypsum Board Inlay: BAUCO Rondo - Circular Access Panels for Drywall.Best Access Doors: www.bestaccessdoors.com/#sle.Universal Access Panel Drywall: Best Access Doors; Series BA-UAP.InvisaHatch Drywall Inlay with Fully Detachable Hatch: Best Access Doors; Series BA-IVH.InvisaHatch Drywall Inlay Access Panel for Tiling: Best Access Doors; Series BA-IVT.InvisaHatch Drywall Inlay with Fully Detachable Hatch with Mud-In Flange: Best Access Doors; Series BA-IVHDF.Concealed Touch Latch Aesthetic Access Door with Mud-In Flange for Drywall: Best Access Doors; Series BA-TLDF.Fire-Rated Insulated Access Panel for Drywall: Best Access Doors; Series BA-FRI.Fire-Rated Insulated Access Panel in Stainless Steel for Drywall: Best Access Doors; Series BA-FRI-SS.Fire-Rated Insulated Access Panel with Mud-In Flange: Best Access Doors; Series BA-FRI-DF.Cendrex, Inc: www.cendrex.com/#sle.Wall-Mounted Units: Cendrex CTR, contoured cover concealing frame, pantograph hinge.Fire-Rated Wall-Mounted Units - 3 Hours: Cendrex PFI.Fire-Rated Wall-Mounted Units - 2 Hours or Less: Cendrex PFI series, insulated.Fire-Rated Ceiling-Mounted Units: Cendrex PFI series, downward opening.Recess-Mounted Units for Wall Finish: Cendrex AHA, without flange.Security Rated Units: Cendrex MDS, medium security.Heavy Duty Access Door Units for Large Openings with Exposed Flange: Cendrex HHD-110.Heavy Duty Access Door Units for Large Openings with Drywall Bead Flange: Cendrex HHD-GP-110.Insulated Aluminum Units: Cendrex PAL.Attic Draft Stop Units: Cendrex DRD.Removable Panel Units - No Hinge: Cendrex FLE-00, metal contoured magnetic cover concealing frame.Concealed Flange and Latch Units: Cendrex CTR-MAG.Ceiling-Mounted Units: Cendrex GFRG-PUR, with push up radius corners.Elmdor: www.elmdor.com/#sle.Fire-Rated Wall-Mounted Units: Elmdor FR Series.Fire-Rated Ceiling-Mounted Units: Elmdor FRC Series.FF Systems, Inc: www.ffsystemsinc.com/#sle.Non-Removable, with Drywall Inlay: FF Systems; System F1.Oversized Multi-Door for Walls: FF Systems; System F1.Removable, with Drywall Inlay: FF Systems; System F2 AK.Oversized Multi-Door for Ceilings: FF Systems; System F2.Air and Dust-Resistant: FF Systems; System F2.Wall Application Only: FF Systems; System F2 DF.Tile Applications: FF Systems; System F3.Round Aluminum Panel: FF Systems; System R.Drywall Access Panel for Masonry Applications: FF Systems; System MW.Exterior Facade for Plaster: FF Systems; System MPLV.Karp Associates, Inc;[____]: www.karpinc.com/#sle.MIFAB, Inc; UA Series: www.mifab.com/#sle.Milcor, Inc;[____]: www.milcorinc.com/#sle.Nystrom, Inc;[____]: www.nystrom.com/#sle.Studco

Building Systems; EZConcept AccessDor : www.studcosystems.com/#sle.[____].Substitutions: .

c. Best Access Doors: www.bestaccessdoors.com/#sle.
d. Cendrex, Inc: www.cendrex.com/#sle.
e. Elmdor: www.elmdor.com/#sle.
f. FF Systems, Inc: www.ffsystemsinc.com/#sle.
g. Karp Associates, Inc: www.karpinc.com/#sle.
h. MIFAB, Inc: www.mifab.com/#sle.
i. Milcor, Inc: www.milcorinc.com/#sle.
j. Nystrom, Inc: www.nystrom.com/#sle.
k. Studco Building Systems; www.studcosystems.com/#sle.

B. Wall-Mounted Unit:
1. Location: As required to access concealed mechanical, electrical, and plumbing equipment.
2. Panel Material: Steel, Stainless Steel where indicated on drawings.
3. Size: As indicated on drawings.
4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
5. Wall Mounting Criteria: Provide concealed flange face frame and door surface flush with frame surface.

C. Fire-Rated Wall-Mounted Units:
1. Location: As indicated on drawings.
2. Wall Fire-Rating: As indicated on drawings.
3. Panel Material: Steel, Stainless Steel where indicated on drawings.
4. Size: As indicated on drawings.
5. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.

D. Ceiling-Mounted Units:
1. Location: As indicated on drawings.
2. Panel Material: Steel, Stainless Steel where indicated on drawings.
3. Size: As indicated on drawings.
4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
5. Ceiling Mounting Criteria: Provide concealed flangeface frame and door surface flush with frame surface.

2.2 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
   1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
   2. Provide mounting holes in frames for attachment of units to metal or wood framing.
   3. Provide mounting holes in frame for attachment of masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
   1. For cylinder locks, furnish two keys per lock and key all locks alike.

E. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that rough openings are correctly sized and located.

B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to proceeding with this work.

B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.3 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

3.4 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083100

SECTION 084113 - ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Aluminum-framed storefront systems.

1.2 ALLOWANCES

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
   1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
   2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
      a. Joinery, including concealed welds.
      b. Anchorage.
      c. Expansion provisions.
      d. Glazing.
      e. Flashing and drainage.
   3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
   1. Joinery, including concealed welds.

2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

E. Delegated Design Submittal: For aluminum-framed entrances and storefronts including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:
1. For Installer.
2. For professional engineer's experience with providing delegated design engineering services of the kind indicated, including documentation that engineer is licensed in the state in which Project is located.

B. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.

C. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

B. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C1401 recommendations for post-installation-phase quality-control program.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and that employs 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.

B. 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.

C. Structural-Sealant Glazing: Comply with ASTM C1401 for design and installation of entrances and storefronts systems that include structural glazing.

1.8 WARRANTY

A. Special Warranty: Installer agrees 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. Water penetration through fixed glazing and framing areas.
      d. Failure of operating components.
   2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Warranty Period: 10 years from date of Substantial Completion.

C. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
      c. Cracking, peeling, or chipping.
   2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "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, 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: As indicated on Drawings.

D. Deflection of Framing Members Supporting Glass: At design wind load, as follows:
   1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches.
   2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.

E. Structural: Test in accordance with ASTM E330/E330M as follows:
   1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
   2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

F. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure.

G. Water Penetration under Dynamic Pressure: Test in accordance with 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.
   2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

H. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
   1. Air Leakage:
      a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft. when tested in accordance with ASTM E283.
      b. Entrance Doors: Air leakage of not more than [1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.

I. Ballistics Resistance, UL 752: Level 8 when tested in accordance with UL 752.

J. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
   2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested in accordance with AAMA 501.5.

K. Structural-Sealant Joints:
   1. Designed to carry gravity loads of glazing.

L. Structural Sealant: ASTM C1184. Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed, aluminum-framed entrances and storefronts without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
   1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
   2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate, because sealant-to-substrate bond strength exceeds sealant's internal strength.

2.3 NON-RATED STOREFRONT SYSTEMS

A. For applications 10'-0" high or less (See elevations on drawings).

B. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by Kawneer, An Arconic Company, or comparable product by one of the following:
   1. EFCO, LLC.
   2. Oldcastle Infrastructure, Inc.
   3. TRACO.
   4. Vistawall Architectural Products
   5. YKK AP America, Inc.

C. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

D. Framing System Basis-of-Design:
   1. Exterior Applications: Kawneer Trifab 451UT Framing System
      a. Framing Construction: Thermally broken.
      b. Glazing System: Retained mechanically with gaskets on four sides.
      c. Glazing Plane: Center
      d. Finish: Clear anodic finish, Color anodic finish, baked-enamel, or powder-coat finish, selected from manufacturer's full range by Owner.
      e. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
      f. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
      g. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
      h. Frame Sightline: 2 inch (50.8 mm)
      i. Frame Depth: 4 1/2 inch (114.3 mm)

2.4 NON-RATED CURTAIN WALL SYSTEMS

A. For applications 10'-0" high or more (See elevations on drawings).

B. Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by Kawneer, An Arconic Company, or comparable product by one of the following:
   1. EFCO, LLC.
   2. Oldcastle Infrastructure, Inc.
   3. TRACO.
   4. Vistawall Architectural Products

5. YKK AP America, Inc.

C. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

D. Framing System Basis-of-Design:
1. Exterior Applications: Kawneer 1600UT System 1 Curtain Wall
a. Framing Construction: Thermally broken.
b. Glazing System: Retained mechanically with gaskets on four sides.
c. Glazing Plane: Front
d. Finish: Clear anodic finish, Color anodic finish, baked-enamel, or powder-coat finish, selected from manufacturer's full range by Owner.Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.Steel Reinforcement: As required by manufacturer.
e. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
f. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
g. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
h. Frame Sightline: 2 1/2 inch (63.5 mm)
i. Frame Depth: 6 inch (152.4 mm)

2.5 GLAZING

A. Glazing: Comply with Section 088000 "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. Structural Glazing Sealants: ASTM C1184 chemically curing silicone formulation that is compatible with system components with which it comes in contact; specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in storefront system indicated.
1. Color: As selected by Architect from manufacturer's full range of colors.

E. Weatherseal Sealants: ASTM C920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed storefront manufacturers for this use.

1. Color: Match structural sealant.

2.6 MATERIALS

A. Sheet and Plate: ASTM B209.

B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.

C. Structural Profiles: ASTM B308/B308M.

D. Steel Reinforcement:
   1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
   2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
   3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

E. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.7 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
   2. Reinforce members as required to receive fastener threads.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
   1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

E. Rigid PVC filler.

2.8 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Physical and thermal isolation of glazing from framing members.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. Provisions for field replacement of glazing from interior.
   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. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

F. Storefront Framing: Fabricate components for assembly using screw-spline system.

G. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
   1. At interior and exterior doors, provide compression weather stripping at fixed stops.

H. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm thicker.
   1. Color: As selected by Architect from full range of industry colors and color densities.

B. Color Anodic Finish: AAMA 611, AA-M12C22A44, Class I, 0.018 mm thicker.
   1. Color: As selected by Architect from full range of industry colors and color densities.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
   1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.10 SOURCE QUALITY CONTROL

A. Structural Sealant: Perform quality-control procedures complying with ASTM C1401 recommendations, including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

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, GENERAL

A. Comply with manufacturer's written instructions.

B. Do not install damaged components.

C. Fit joints to produce hairline joints free of burrs and distortion.

D. Rigidly secure nonmovement joints.

E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

F. Seal perimeter and other joints watertight unless otherwise indicated.

G. Metal Protection:
   1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
   2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

I. Install joint filler behind sealant as recommended by sealant manufacturer.

J. Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF GLAZING

A. Install glazing as specified in Section 088000 "Glazing."

3.4 INSTALLATION OF STRUCTURAL GLAZING

A. Prepare surfaces that will contact structural sealant in accordance with sealant manufacturer's written instructions, to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

B. Set glazing into framing in accordance with sealant manufacturer and framing manufacturer's written instructions and standard practice. Use a spacer or backer as recommended by manufacturer.

C. Set glazing with proper orientation so that coatings face exterior or interior as specified.

D. Hold glazing in place using temporary retainers of type and spacing recommended by manufacturer, until structural sealant joint has cured.

E. Apply structural sealant to completely fill cavity, in accordance with sealant manufacturer and framing manufacturer's written instructions and in compliance with local codes.

F. Apply structural sealant at temperatures indicated by sealant manufacturer for type of sealant.

G. Allow structural sealant to cure in accordance with manufacturer's written instructions.

H. Clean and protect glass as indicated in Section 088000 "Glazing."

3.5 INSTALLATION OF WEATHERSEAL SEALANT

A. After structural sealant has completely cured, remove temporary retainers and insert backer rod between lites of glass as recommended by sealant manufacturer.

B. Install weatherseal sealant to completely fill cavity, in accordance with sealant manufacturer's written instructions, to produce weatherproof joints.

3.6 ERECTION TOLERANCES

A. Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
   2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
      c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.

4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

END OF SECTION 084113

SECTION 085113 - ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Extruded aluminum windows

B. Operating hardware.

C. Insect screens.

1.2 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Rough opening framing.

B. Section 079200 - Joint Sealants: Sealing joints between window frames and adjacent construction.

C. Section 088000 - Glazing.

1.3 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights; 2017.

B. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.

C. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products; 2021.

D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2025.

E. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

F. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2020, with Errata (2022).

G. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

H. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

I. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2021, with Errata (2022).

J. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020, with Errata (2022).

K. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

L. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

M. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

N. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

O. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

P. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

Q. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

R. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.

S. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

T. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).

U. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.

V. ASTM E1332 - Standard Classification for Rating Outdoor-Indoor Sound Attenuation; 2022.

W. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2020.

X. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2019c.

Y. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2017.

Z. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5 SUBMITTALS

A. Product Data: Include component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.

B. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, anchorage locations, and installation requirements.

C. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
1. Evidence of AAMA Certification.
2. Evidence of WDMA Certification.
3. Evidence of CSA Certification.
4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

D. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

E. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Specimen warranty.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Cam Locks: Provide an additional ten (10) cam locks, for each type installed, per building, as attic stock for Owner.
   2. Limit Stop: Provide an additional ten (10) limit stops, for each type installed, per building, as attic stock for Owner.
   3. Poles: Provide an additional five (5) poles, per building, as attic stock for Owner.
   4. Pole Rings: Provide an additional ten (10) pole rings, for each type installed, per building, as attic stock for Owner.
   5. Handles: Provide an additional twenty (20) handles, for each type installed, per building, as attic stock for Owner.
   6. Sash Locks: Provide an additional ten (10) sash locks, for each type installed, per building, as attic stock for Owner.
   7. Sash Limit Stops: Provide an additional ten (10) sash limit stops, for each type installed, per building, as attic stock for Owner.
   8. Insect Screens: Provide an additional ten (10) insect screens, for each type installed, per building, as attic stock for Owner.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least ten years of documented experience and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of AAMA CW-10.

B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.9 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.10 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Correct defective work within a two (2) year period after Date of Substantial Completion.

C. Manufacturer Warranty: Provide 10-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with manufacturer.

D. Manufacturer Warranty: Provide 10-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Subject to compliance with requirements, provide OptiQ AA Series Aluminum Window Assemblies manufactured by Kawneer, An Arconic Company, or a comparable product by one of the following:
1. Arcadia, Inc: www.arcadiainc.com/#sle.
2. EFCO Corp.: www.efcocorp.com/#sle.
3. ES Windows: www.eswindows.com/#sle.
4. Manko Window Systems, Inc: www.mankowindows.com/#sle.
5. Quaker Window Products Company: www.quakercommercialwindows.com/#sle.
6. Wausau Window and Wall Systems: www.wausauwindow.com/#sle.
7. Winco Window Company, Inc: www.wincowindow.com/#sle.

2.2 ALUMINUM WINDOWS

A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
1. Frame Depth: Varies.
2. Operable Units: Double weatherstripped.
3. Provide factory-glazed units.
4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
5. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

6. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
8. Thermal Movement: Design to accommodate thermal movement caused by 180 degrees F surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.

B. Fixed, Non-Operable Type (See drawings for locations):
1. Basis of Design: Kawneer OptiQ AA 4325 - Fixed
2. Construction: Thermally broken.
3. Glazing: As indicated on drawings and coordinated with Glazing specification sections.
4. Exterior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
5. Interior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.

C. Outswinging Casement Type (See drawings for locations):
1. Basis of Design: Kawneer OptiQ AA 4325 - Casement
2. Construction: Thermally broken.
3. Provide removable screens.
4. Glazing: As indicated on drawings and coordinated with Glazing specification sections.
5. Exterior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
6. Interior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
7. Hardware:
    a. Locking: Cam Locks
    b. Hinging: Butt Hinges, Limit Stops, and Friction Adjusters
    c. Other: Roto Operator, Pole Ring, and Pole

D. Inswinging Hopper Type (See drawings for locations):
1. Basis of Design: Kawneer OptiQ AA 4325 - Project-In
2. Construction: Thermally broken.
3. Provide fixed screens.

4. Glazing: As indicated on drawings and coordinated with Glazing specification sections.
5. Exterior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
6. Interior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
7. Hardware:
    a. Locking: Cam Locks
    b. Hinging: Butt Hinges, Limit Stops, and Friction Adjusters
    c. Other: Roto Operator, Pole Ring, and Pole

E. Horizontal Sliding Type (See drawings for locations):
1. Basis of Design: Kawneer OptiQ AA 5450 - Single Slide
2. Construction: Thermally broken.
3. Provide removable screens.
4. Glazing: As indicated on drawings and coordinated with Glazing specification sections.
5. Exterior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
6. Interior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
7. Hardware:
    a. Handles: Continuous, Integral Pulls.
    b. Locking: Sash Locks, Standard Auto Locks
    c. Roller: Composite Adjustable Tandem Type
    d. Roller Track: Stainless Steel
    e. Other: Sash Limit Devices

F. Double-Hung Type (See drawings for locations):
1. Basis of Design: Kawneer OptiQ AA 5450 - Double Hung
2. Construction: Thermally broken.
3. Provide removable screens.
4. Glazing: As indicated on drawings and coordinated with Glazing specification sections.
5. Exterior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.

6. Interior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
7. Hardware:
    a. Sash Balances: Class 5, Adjustable Spiral, Stainless Steel, Two Per Sash
    b. Locking: Sash Locks at Meeting Rails, Spring Loaded Sash Locks at Top and Bottom Sashes, Quantity Determined By Window Size
    c. Handles: Continuous, Integral Pull at Top and Bottom Sashes
    d. Autolock: Aluminum at Top Sash Lift Handles
    e. Other: Pole Ring, and Sash Limit Devices, Two Per Sash

G. Single Hung Type (See drawings for locations):
1. Basis of Design: Kawneer OptiQ AA 5450 - Single Hung
2. Construction: Thermally broken.
3. Provide removable screens.
4. Glazing: As indicated on drawings and coordinated with Glazing specification sections.
5. Exterior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
6. Interior Finish: Class I natural anodized, Class I color anodized, or 70% fluoropolymer (PVDF), selected by Owner from full range of manufacturer's colors.
7. Hardware:
    a. Sash Balances: Class 5, Adjustable Spiral, Stainless Steel, Two Per Sash
    b. Locking: Sash Locks at Meeting Rails, Spring Loaded Sash Locks at Bottom Sashes, Quantity Determined By Window Size
    c. Handles: Continuous, Integral Pull at Bottom Sashes
    d. Other: Sash Limit Devices, Two Per Sash

2.3 PERFORMANCE REQUIREMENTS

A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
1. Performance Class (PC): AW.
2. Performance Grade (PG):
    a. PG80 - Fixed, Non-Operable Windows
    b. PG80 - Outswinging Casement
    c. PG80 - Project-In Windows
    d. PG40 - Horizontal Sliding Windows
    e. PG65 - Double Hung Window
    f. PG65 - Single Hung Window

B. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 psf.

D. Air Leakage: 0.1 cfm/sq ft maximum leakage per unit area of outside window frame dimension when tested at 1.57 psf pressure difference in accordance with ASTM E283/E283M.

E. Overall Thermal Transmittance (U-value)
1. Fixed:0.38, maximum, including glazing, measured on window sizes required for this project.
2. Opperable: 0.45, maximum, including glazing, measured on window sizes required for this project.

F. Rescue Windows: Submitted manufacturers product shall comply with New York State Education Department (SED) S106-4 and the following:
1. Clear Opening: Minimum clear opening area for unit 6 sq.ft. Provide horizontally and vertically 24 inches minimum dimensions for the clear opening.
2. Labels: Provide window labels on inside and outside faces.
a. Bright yellow background with black letters.
b. Size: Minimum 3 by 5 inches.
c. Text: "RESCUE WINDOW" readable from each side of the unit.
3. Provide labels at rescue window units of all student occupied spaces.
4. Rescue window latching: Maximum height of window latch is 54 inches above finished floor, typical all locations

2.4 COMPONENTS

A. Frames: Depth and width varies; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.

B. Sills: .040 inch thick, extruded aluminum; sloped for positive wash; fit under sash leg to 1/2 inch beyond wall face; one piece full width of opening; jamb angles to terminate sill end.

C. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
1. Hardware: Spring loaded steel pins
2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
3. Frame Finish: Same as frame and sash.
4. Rescue Window Locations: Provide sliding screens. All other screens to be fixed.

D. Operable Sash Weatherstripping: Nylon pile; permanently resilient, profiled to achieve effective weather seal.

E. Fasteners: Non-magnetic Stainless Steel.

F. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.5 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5005 alloy, H12 or H14 temper.

C. Concealed Steel Items: Profiled to suit mullion sections; galvanized in accordance with ASTM A123/A123M.

2.6 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41, clear anodic coating not less than 0.7 mil thick.

B. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42, integrally colored anodic coating not less than 0.7 mil thick.

C. Superior Performing Organic Coatings System: Manufacturer's standard multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.

D. Finish Color: As selected by Architect from manufacturer's full range.

E. Operator and Exposed Hardware: Enameled to color as selected from manufacturer's standard line.

F. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

G. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.

H. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 072500.

3.2 PRIME WINDOW INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Install windows in accordance with ASTM E2112.

C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

D. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

E. Install sill and sill end angles.

F. Set sill members and sill flashing in continuous bead of sealant.

G. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

H. Install operating hardware not pre-installed by manufacturer.

I. Install glass and infill panels in accordance with requirements; see Section 088000.

3.3 TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 FIELD QUALITY CONTROL

A. Provide services of aluminum window manufacturer's field representative to observe for proper installation of system and submit report.

B. See Section 014000 - Quality Requirements for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

C. Provide field testing of installed aluminum windows by AAMA accredited independent laboratory in accordance with AAMA 502 and AAMA/WDMA/CSA 101/I.S.2/A440 during construction process and before installation of interior finishes.

1. Perform tests on three individual windows of each type, at each building, in designated locations as directed by Architect.

2. Field test for water penetration in accordance with ASTM E1105 using Procedure A - uniform for AW windows static air pressure difference; test pressure shall not be less than 1.9 psf.
3. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf.

D. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.6 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

D. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION 085113

SECTION 085213 - ALUMINUM-CLAD WOOD WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Factory-fabricated aluminum-clad wood windows.

B. Glazing.

C. Aluminum trim for exterior finishing.

D. Wood trim for interior finishing.

1.2 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Rough opening framing.

B. Section 072500 - Weather Barriers: Sealing frames to water-resistive barrier installed on adjacent construction.

C. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.

D. Section 088000 - Glazing.

1.3 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights; 2017.

B. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products; 2021.

C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

D. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.

E. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2021, with Errata (2022).

F. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2020, with Errata (2022).

G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

H. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

J. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).

K. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.

L. ASTM E1332 - Standard Classification for Rating Outdoor-Indoor Sound Attenuation; 2022.

M. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2020.

N. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2019c.

O. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2017.

P. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

Q. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

R. FLA (PAD) - Florida Building Code Online - Product Approval Directory; Current Edition.

S. Miami (APD) - Approved Products Directory; Miami-Dade County; Current Edition.

T. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: For each window type, show component dimensions, anchorage and fasteners, glass, and internal drainage details

C. Shop Drawings: For each window type, indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.

D. Samples: One sample illustrating window frame section.

E. Manufacturer's Certificate: Certify that products furnished meet or exceed specified requirements.

F. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
   1. Evidence of AAMA Certification; label or other documentation.
   2. Evidence of WDMA Certification.
   3. Evidence of CSA Certification.
   4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

G. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

H. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

I. Manufacturer's qualification statement.

J. Installer's qualification statement.

K. Specimen warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than ten years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least ten years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect factory finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.8 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and after installation of sealants.

1.9 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Manufacturer Warranty: Provide 5-year manufacturer warranty for insulated glass units against seal failure, interpane dusting or misting, and replacement of same. Complete forms in Owner's name and register with manufacturer.

D. Manufacturer Warranty: Provide 2-year manufacturer warranty against defects listed. Complete forms in Owner's name and register with manufacturer or warrantor.
   1. Degradation of color finish.
   2. Delamination or separation of finish cladding from window member.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Aluminum-Clad Wood Windows: Provide Custom Aluminum Clad Wood Windows manufactured by Marvin, or a comparable product by:
   1. Andersen Windows, Inc: www.andersenwindows.com/#sle.
   2. Pella Corporation: www.pellacommercial.com/#sle.
   3. Quaker Window Products Company; _____: www.quakerresidentialwindows.com/#sle.
   4. Weather Shield Manufacturing, Inc: www.weathershield.com/#sle.

2.2 ALUMINUM-CLAD WOOD WINDOWS

A. Aluminum-Clad Wood Windows: Wood frame and sash with aluminum-clad exterior, factory fabricated and assembled.
   1. Exterior Finish: Aluminum-clad, painted.
   2. Interior Finish: Wood, stained.
   3. Colors: As selected by Architect from manufacturer's full range of paints and stains.
   4. Configuration: Fixed, non-operable.
   5. Window Product Types: FW - Fixed window, in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
   6. Factory glazed; dry glazing method.

7. Wood Species: Clear pine, preservative treated using treatment type suitable for required finish.
8. Frame and Sash Members: Mortise and tenon joints. Glue and steel pin joints to hairline fit, weather tight.
9. Metal Cladding: Formed aluminum, factory finished, factory fit to profile of wood members.
10. Weather Stop Flange: Continuous at perimeter of unit.
11. Clearances and Shim Spacing: Minimum required for installation and dynamic movement of perimeter seal.
12. Fasteners: Concealed from view.
13. Internal Drainage of Glazing Spaces to Exterior: Weep holes.

2.3 COMPONENTS

A. Glazing: Double glazed, clear, Low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions.

B. Glass and Glazing Materials: See Section 088000.

C. Frames: Profiled, flush glass stops to match cladding, of screw fastened type, sloped for positive drainage.

D. Mullions: Custom design, see drawings.

E. Sills: Extruded aluminum, sloped for positive drainage (away from building); fits under sash and projects at least 1/2 inch beyond exterior face of wall; single piece full width of opening.

F. Stools: Wood; fit under sash to project 1/2 inch beyond interior wall face; one piece full width of opening.

G. Muntins/Grilles: Grilles permanently installed on outside and inside faces of insulating glass.
1. Pattern: Custom design, see drawings.
2. Bar Width: Custom design, see drawings.
3. Colors: Match interior and exterior of frame.
a. Interior: Wood, stained, color to be selected by Architect.
b. Exterior: Aluminum-clad, painted, color to be selected by Architect.

H. Fasteners: Stainless steel.

I. Aprons: Aluminum, internally reinforced, edged and sealed.

J. Sealant and Backing Materials: See Section 079200 of types as indicated.
1. Perimeter Sealant: Appropriate for application.
2. Sealant Used Within System (Not Used for Glazing): Appropriate for application.

K. Wood for Casings and Trim: Clear pine, clear preservative treated, of type suitable for required finish.

L. Flashing: Provide related flashings, with necessary anchors and attachment devices.

M. Sealant for Setting Sills, Stools, Aprons, and Sill Flashing: Non-curing butyl type.

2.4 PERFORMANCE REQUIREMENTS

A. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 requirements for the specific window type in accordance with the following:
   1. Performance Class (PC): AW.
   2. Performance Grade (PG): 40, with minimum design pressure (DP) of 40.10 psf.

B. Fenestration Assembly Thermal transmittance (U-value): Comply with ASHRAE Std 90.1 I-P for building envelope requirements for applicable climate zone.

2.5 ALUMINUM FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42, integrally colored anodic coating not less than 0.7 mils thick.

B. Superior Performing Organic Coatings: AAMA 2605, multiple coat, thermally cured polyvinylidene fluoride system.

C. Pigmented Organic Coatings: AAMA 2603, polyester or acrylic baked enamel finish.

D. Color: To be selected by Architect from manufacturer's full range.

E. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify wall openings and adjoining water-resistive barrier materials are ready to receive wood windows; see Section 072500.

3.2 INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Install windows in accordance with ASTM E2112.

C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

D. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

E. Install sills, stools, and aprons.

F. Set sill members and sill flashing in continuous bead of sealant.

G. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

3.3 TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inch per 3 ft non-cumulative or 1/8 inch per 10 ft, whichever is less.

3.4 FIELD QUALITY CONTROL

A. Provide services of wood window manufacturer's field representative to observe for proper installation of system and submit report.

B. See Section 014000 - Quality Requirements for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

C. Provide field testing of installed wood windows by independent laboratory in accordance with AAMA 502 and AAMA/WDMA/CSA 101/I.S.2/A440 during construction process and before installation of interior finishes.
   1. Perform tests on all windows.
   2. Field test for water penetration in accordance with ASTM E1105 using Procedure B - cyclic static air pressure difference; test pressure shall not be less than 1.9 psf.
   3. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf.
      a. Maximum allowable rate of air leakage is 0.30 cfm/sq ft.

D. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5 CLEANING

A. Remove protective material from factory finished surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION 085213

SECTION 087100 - DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
   1. Door hardware for:
      a. Swinging doors.

B. Related Sections:
   1. Division 07 Section “Joint Sealants” for sealant requirements applicable to threshold installation specified in this section.
   2. Division 09 Sections for touchup finishing or refinishing of existing openings modified by this section.

1.3 REFERENCES

A. Fire/Life Safety
   1. NFPA - National Fire Protection Association.
      a. NFPA 70 – National Electric Code.
      b. NFPA 80 - Standard for Fire Doors and Fire Windows.
      c. NFPA 101 - Life Safety Code.
      d. NFPA 105 - Smoke and Draft Control Door Assemblies.
   2. State Fire Safety Code.

B. UL - Underwriters Laboratories
   1. UL 10B - Fire Test of Door Assemblies.
   2. UL 10C - Positive Pressure Test of Fire Door Assemblies.
   3. UL 1784 - Air Leakage Tests of Door Assemblies.
   4. UL 305 - Panic Hardware.

C. Accessibility
   1. ADA - Americans with Disabilities Act .
   2. ANSI A117.1 - Accessible and Usable Buildings and Facilities.

D. DHI - Door and Hardware Institute
   1. Sequence and Format for the Hardware Schedule.

2. Recommended Locations for Builders Hardware.
3. Key Systems and Nomenclature.

E. ANSI - American National Standards Institute
1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties.

1.4 SUBMITTALS

A. General:
1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B. Action Submittals:
1. Product Data: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Samples for Verification: If requested by Architect, submit production sample or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.
a. Samples will be returned to supplier in like-new condition. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
3. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
a. Door Index; include door number, heading number, and Architects hardware set number.
b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
c. Type, style, function, size, and finish of each hardware item.
d. Name and manufacturer of each item.
e. Fastenings and other pertinent information.
f. Location of each hardware set cross-referenced to indications on Drawings.
g. Explanation of all abbreviations, symbols, and codes contained in schedule.
h. Mounting locations for hardware.

i. Door and frame sizes and materials.
j. Name and phone number for local manufacturer's representative for each product.

4. Key Schedule:
   a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
   b. Use ANSI A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
   e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
      1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
   f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
5. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory prepared for door hardware installation.

C. Informational Submittals:
1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Product Certificates for electrified door hardware, signed by manufacturer:
   a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
3. Certificates of Compliance:
   a. Certificates of compliance for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
   b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in "QUALITY ASSURANCE" article, herein.
   c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in "QUALITY ASSURANCE" article, herein.
4. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by qualified testing agency, for door hardware on doors located in accessible routes.

5. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:
   1. Operations and Maintenance Data : Provide in accordance with Division 01 and include:
      a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
      b. Catalog pages for each product.
      c. Name, address, and phone number of local representative for each manufacturer.
      d. Parts list for each product.
      e. Final approved hardware schedule, edited to reflect conditions as-installed.
      f. Final keying schedule
      g. Copies of floor plans with keying nomenclature
      h. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.5 QUALITY ASSURANCE

A. Product Substitutions: Comply with product requirements stated in Division 01 and as specified herein.
   1. Where specific manufacturer's product is named and accompanied by "No Substitute," including make or model number or other designation, provide product specified. (Note: Certain products have been selected for their unique characteristics and particular project suitability.)
      a. Where no additional products or manufacturers are listed in product category, requirements for "No Substitute" govern product selection.
   2. Where products indicate "acceptable substitute" or "acceptable manufacturer", provide product from specified manufacturers, subject to compliance with specified requirements and "Single Source Responsibility" requirements stated herein.

B. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
   1. Warehousing Facilities: In Project's vicinity.
   2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
   3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

4. Coordination Responsibility: Coordinate installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
    a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

C. Installer Qualifications: Qualified tradesmen, skilled in application of commercial grade hardware with record of successful in-service performance for installing door hardware similar in quantity, type, and quality to that indicated for this Project.

D. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC.)
2. Can provide installation and technical data to Architect and other related subcontractors.
3. Can inspect and verify components are in working order upon completion of installation.
4. Capable of producing wiring diagrams.
5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

E. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
2. Manufacturers that perform electrical modifications and that are listed by testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

F. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release latch. Locks do not require use of key, tool, or special knowledge for operation.

G. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of wrist and that operate with force of not more than 5 lbf (22.2 N.)
2. Maximum opening-force requirements:
    a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
    b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
    c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
4. Adjust door closer sweep periods so that, from open position of 70 degrees, door will take at least 3 seconds to move to 3 inches (75 mm) from latch, measured to leading edge of door.

H. Pre-installation Conference: Conduct conference at Project site
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

I. Coordination Conferences:
1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
a. Attendees: Door hardware supplier, door hardware installer, Contractor.
b. After meeting, provide letter of compliance to Architect, indicating when meeting was held and who was in attendance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
1. Deliver each article of hardware in manufacturer’s original packaging.

C. Project Conditions:
1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
2. Provide secure lock-up for door hardware delivered to Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:
1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.

3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

F. Deliver keys and permanent cores (if applicable) to Owner by registered mail or overnight package service.

1.7 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Direct shipments not permitted, unless approved by Contractor.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Years from date of Substantial Completion, for durations indicated.
a. Closers:
1) Mechanical: 30 years for surface closers and 15 years for concealed closers
b. Exit Devices:
1) Mechanical: 3 years.
c. Locksets:
1) Mechanical: 3 years.
d. Continuous Hinges: Lifetime warranty.
e. Key Blanks: Lifetime
2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.9 MAINTENANCE

A. Maintenance Tools:
1. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Approval of manufacturers other than those listed shall be in accordance with QUALITY ASSURANCE article, herein.

B. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.2 MATERIALS

A. Fasteners
1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
4. Install hardware with fasteners provided by hardware manufacturer.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.3 KEYING

A. Keying Requirements – General
1. Permanent cylinders/cores keyed by the manufacturer according to the following key system.
a. Keying system tied into existing system as directed by the Owner.

2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements shall be cause for replacement of cylinders/cores involved at no additional cost to Owner.

B. Keys
1. Material: Nickel silver; minimum thickness of .092-inch (2.3mm.)
2. Quantity: Furnish in the following quantities.
a. Change (Day) Keys: 3 per cylinder/core.
b. Permanent Control Keys: 3.
c. Master Keys: 6.
d. Unused balance of key blanks shall be furnished to Owner with the cut keys.

2.4 ELECTRIC STRIKES

A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

B. Manufacturer and Product: Von Duprin 6100 Series

C. Strikes shall be suitable for electrified removable mullion.

PART 3 EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
1. Standard Aluminum Doors and Frames: ANSI/SDI A250.8.

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

H. Lock Cylinders: Install construction cores to secure building and areas during construction period.
   1. Replace construction cores with permanent cores as indicated in keying section.
   2. Furnish permanent cores to Owner for installation (if applicable.)

I. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.

J. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

K. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

L. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

M. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

3.3 FIELD QUALITY CONTROL

A. Architectural Hardware Consultant: Engage qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
   1. Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
   1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.5 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.

3.6 DEMONSTRATION

A. Provide training for Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 087100

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SECTION 087100.1 – DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

PART 2 - PRODUCTS

2.1 DOOR HARDWARE MANUFACTURERS

A. BE – Best Access Systems
B. DK – Dormakaba
C. RE - Reese

PART 3 - EXECUTION

3.1 HARDWARE SETS

Exterior #1 – e1				
Function: Egress Doors (Single)				
1	Continuous Hinge	660-680 Series	AL	BE
1	Rim Exit Device	FL 2408 LD x V 2908A x S988	626	BE
1	Permanent Core	Compatible with Existing Key System	626	BE
1	Door Closer	HD7000	689	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018	619	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Door Bottom/Sweep	Manufacturer's standard adjustable door bottom/sweep		
1	Threshold	Stainless Steel, as per Architect's detail		

Exterior #2 – e2				
Function: Pool/Mechanical Room Egress Doors (Double) w/ Removable Mullion				
2	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
2	Rim Exit Device	FL 2408 LD x V 2908A x S988	630	BE
2	Permanent Core	Compatible with Existing Key System	630	BE
2	Door Closer	HD7000 (Stainless Steel)	630	BE
2	Kick Plate	DKP-SS-300	US32D	DK
2	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
2	Gasketing	793 Black		RE
6	Filler Plate	Size as required		DK
1	Removable Mullion	FL822 w/ Base and Key Removable Cap	689	BE
2	Door Bottom/Sweep	Manufacturer's standard adjustable door bottom/sweep		
2	Threshold	Stainless Steel, as per Architect's detail		

Interior #1 – i1				
Function: Office Doors (Single)				
1	Continuous Hinge	660-680 Series	AL	BE
1	Office Lock	9K-3-7-B-15-D w/ Strike Package	626	BE
1	Permanent Core	Compatible with Existing Key System	626	BE
1	Door Closer	HD7000	689	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018	619	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Aluminum, as per Architect's detail		
2	Door Actuator	Provide as specified in Power Door Operators specification section.		
1	Door Operator	Provide as specified in Power Door Operators specification section.		

Interior #2 – i2				
Function: Multi-Occupant Toilet Room Doors (Single)				
1	Continuous Hinge	660-680 Series	AL	BE
1	Holdback Lock	9K-3-7-R-15-D w/ Strike Package	626	BE
1	Permanent Core	Compatible with Existing Key System	626	BE
1	Door Closer	HD7000	689	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018	619	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Aluminum, as per Architect's detail		

Interior #3 – i3				
Function: Single-Occupant Toilet Room Doors (Single)				
1	Continuous Hinge	660-680 Series	AL	BE
1	Privacy Lock	9K-3-L-D-15-D w/ Strike Package	626	BE
1	Permanent Core	Compatible with Existing Key System	626	BE
1	Door Closer	HD7000	689	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018	619	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Aluminum, as per Architect's detail		

Interior #4 – i4				
Function: Pool/Locker Room - Egress Doors (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Classroom Lock	9K-3-7-R-15-D w/ Strike Package	626AM	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Epoxy, as per Architect's detail		

Interior #5 – i5				
Function: Pool/Locker Room - Office Doors (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Office Lock	9K-3-7-B-15-D w/ Strike Package	626AM	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Epoxy, as per Architect's detail		

Interior #6 – i6				
Function: Pool/Locker Room – Interior Storage Room Doors (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Privacy Lock	9K-3-L-D-15-D w/ Strike Package	626AM	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Epoxy, as per Architect's detail		

Interior #7 – i7				
Function: Pool/Locker Room - Toilet Room Doors (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Privacy Lock	9K-3-L-D-15-D w/ Strike Package	626AM	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Epoxy, as per Architect's detail		

Interior #8 – i8				
Function: Pool/Locker Room – Corridor Storage Room Doors (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Privacy Lock	9K-3-L-D-15-D w/ Strike Package	626AM	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Marble, as per Architect's detail		

Interior #9 – i9				
Function: Pool/Locker Room - Egress Doors to Corridor (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Classroom Lock	9K-3-7-R-15-D w/ Strike Package	626AM	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Marble, as per Architect's detail		

Interior #10 – i10				
Function: Pool/Locker Room - Toilet Room Doors (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Privacy Lock	9K-3-L-D-15-D w/ Strike Package	626AM	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Marble, as per Architect's detail		

Interior #11 – i11				
Function: Pool/Locker Room - Egress Doors to Stair (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Rim Exit Device	FL 2408 LD x V 2908A x S988	630	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Stainless Steel, as per Architect's detail		

Interior #12 – i12				
Function: Pool/Locker Room – First Aid Room Doors (Single)				
1	Continuous Barrel Hinge	640-650 Series (Stainless Steel)	304	BE
1	Office Lock	9K-3-7-B-15-D w/ Strike Package	626AM	BE
1	Permanent Core	Compatible with Existing Key System	630	BE
1	Door Closer	HD7000 (Stainless Steel)	630	BE
1	Kick Plate	DKP-SS-300	US32D	DK
1	Door Stop	DDS-NP-018 (Stainless Steel)	630	DK
1	Gasketing	793 Black		RE
3	Filler Plate	Size as required		DK
1	Threshold	Stainless Steel, as per Architect's detail		

END OF SECTION 087100.1

SECTION 087113 - POWER DOOR OPERATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Operators for swinging doors.

B. Controllers, actuators, and safety devices.

C. Maintenance.

1.2 RELATED REQUIREMENTS

A. Section 087100 - Door Hardware: Balance of door hardware.

1.3 DEFINITIONS

A. Activation Device: Device that sends an electrical signal to door operator to open door when actuated.

B. Knowing Act: Consciously initiating the opening of a power-operated door using acceptable methods, including wall-mounted switches such as push plates and controlled access devices such as keypads, card readers, and key switches.

1.4 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. BHMA A156.10 - Power Operated Pedestrian Doors; 2017.

D. BHMA A156.19 - Power Assist and Low Energy Power Operated Swinging Doors; 2019.

E. ITS (DIR) - Directory of Listed Products; Current Edition.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL (DIR) - Online Certifications Directory; Current Edition.

I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate power door operators with balance of door hardware and electrical work required for each affected door opening.
   1. Electrical System Roughing-in: Coordinate layout and installation of power door operators with connections to power supplies, remote activation devices, and electric door latching hardware.

B. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by affected installers.
   1. Architect.
   2. Installer's Architectural Hardware Consultant (AHC).
   3. Construction Manager

1.6 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings:
   1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
   2. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.

C. Product Data: Provide data on system components, sizes, features, and finishes.

D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

G. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

H. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.

I. Specimen warranty.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Wrenches and other tools required for maintenance of equipment.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience and approved by manufacturer.

1.8 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for components of power door operators. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Operators for Swinging Doors:
   1. ASSA ABLOY Entrance Solutions: www.besam-usa.com/#sle.
   2. DORMA USA, Inc: www.dorma.com/#sle.
   3. LCN, an Allegion brand: www.allegion.com/us/#sle.
   4. Horton Automatics: www.hortondoors.com/#sle.
   5. NABCO Entrances Inc: www.nabcoentrances.com/#sle.
   6. Stanley Access Technologies: www.stanleyaccess.com/#sle.
   7. Substitutions: See Section 016000 - Product Requirements.

2.2 POWER DOOR OPERATORS - General

A. Electrically Operated or Controlled Hardware: Provide necessary power supplies, relays, and interfaces as required for proper operation; provide wiring between control components and to building power connection in compliance with NFPA 70.

B. Comply with ADA Standards for egress requirements.

C. Comply with NFPA 101 and requirements of authorities having jurisdiction; provide units selected for actual door weight and for light pedestrian traffic unless otherwise indicated.

D. Exterior and Vestibule Doors: Provide equipment suitable for ambient operating temperature range of minus 20 to plus 140 degrees F.

E. Exterior Doors: Provide units capable of operating, closing, and holding doors closed under positive and negative differential pressure; if necessary, provide power closing.

F. System Integration: Integrate operator functionality with other systems as required for a complete working installation.
   1. Provide time delay relay to signal automatic door operator to activate only after electric lock system is released.
   2. Provide fire alarm interface configurable to safely open or close doors on signal from fire alarm system.
   3. Provide controller output signals at the door closed or door open positions to facilitate interaction with security and access control systems.

2.3 OPERATORS FOR SWINGING DOORS

A. Door Operator: Hydraulic
   1. Applications: Include operators for single and double doors.
   2. Hydraulic Operators: 3/16 hp minimum, self-contained, electrically driven.
   3. Speed Control: Variable, field-adjustable opening and closing cycles.
   4. Functionality: Full-power open, power close operation.
      a. Full-Power Operators: Comply with BHMA A156.10; safeties required.
         1) Comply with UL 325; acceptable evidence of compliance includes UL (DIR) or ITS (DIR) listing or test report by testing agency acceptable to authorities having jurisdiction.
   5. Mounting: Surface mounted overhead.
   6. Components:
      a. Header Case: Manufacturer's standard extruded aluminum profile containing door operator and door mounting components.
      b. Motor and Gearbox Assembly: Manufacturer's standard sealed motor, gearbox, and drive belt.
   7. Power Supply Units: Self-contained, electrically operated, and independent of door operator.
   8. Actuators: Manufacturer's standard.
      a. Actuators and Safeties: As indicated on drawings.

2.4 CONTROLLERS, ACTUATORS, AND SAFETY DEVICES

A. Controllers: Manufacturer's standard for products specified.
   1. Provide microprocessor operated controller for each door.

B. Actuators: Manufacturer's standard for products specified and as specified below.
   1. Comply with BHMA A156.10 for actuator and safety types and zones.

2. Push Plate Actuator: Standard, wall mounted, surface mounted, momentary contact type; satin stainless steel plate.

C. Safety Devices: Manufacturer's standard units recommended for project applications and conditions.
1. Comply with BHMA A156.10 for actuator and safety types and zones.
2. Swinging Door Safety Device: Door-mounted proximity detector device arranged to prevent operation of door when persons or obstructions are in the swing zone.

2.5 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics:
1. 3/16 hp.
2. 5 rated load amperes.
3. 120 volts, single phase, 60 Hz.

B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

C. Disconnect Switch: Factory mount disconnect switch in control panel.

2.6 Finishes

A. Aluminum Finishes: Manufacturer's standard.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify installation conditions including, but not limited to the following: opening sizes, floor conditions, plumb and level mounting surfaces.

B. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.

C. Verify that electric power is available, in the correct location, and of the correct characteristics.

3.2 INSTALLATION

A. Coordinate installation of components with related and adjacent work.

B. Install equipment in accordance with manufacturer's instructions.

C. Provide for thermal expansion and contraction of door and frame units and live and dead loads that may be transmitted to operating equipment.

D. Provide for dimensional distortion of components during operation.

3.3 ADJUSTING

A. Adjust door equipment for correct function and smooth operation.

3.4 CLEANING

A. Remove temporary protection, clean exposed surfaces.

3.5 CLOSEOUT ACTIVITIES

A. Demonstrate to Owner's representative equipment operation, operating components, adjustment features, and lubrication requirements.

3.6 MAINTENANCE

A. Provide service and maintenance of operating equipment for one year from Date of Substantial Completion, at no extra charge to Owner.

END OF SECTION 087113

SECTION 088000 - GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
   1. Glass for doors.
   2. Glass for aluminum windows and storefront framing.
   3. Glazing sealants and accessories.

1.3 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 C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.

C. Glazing Accessory Samples: For sealants and colored spacers, in 12 inch (300 mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. 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.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturers of insulating-glass units with sputter-coated, low-E coatings.

B. Product Certificates: For glass.

C. Product Test Reports: For insulating glass and glazing sealants, for tests performed by a qualified testing agency.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36 month period.

D. Preconstruction adhesion and compatibility test report.

E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

B. 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.

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 C 1021 to conduct the testing indicated.

1.9 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.

1.10 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.)

1.11 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
   1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

1. Basis-of-Design Product: Subject to compliance with requirements, provide Vitro Architectural Glass; products or comparable products by one of the following:
    a. Guardian Industries Corp.; SunGuard.
    b. Oldcastle Building Envelope.
    c. Viracon, Inc.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
1. Obtain tinted glass from single source from single manufacturer.
2. Obtain reflective-coated glass from single source from single manufacturer.

C. 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 014000 "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 2020 NYS Building Code and ASTM E 1300.
1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
    a. Wind Design Data: Refer to 2020 NYS Building Code Section 1603.1.4.
2. 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.

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:
1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K.)
4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. 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: 6 mm.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
   1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
   2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
   3. Interlayer Color: Clear unless otherwise indicated.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
   1. Sealing System: Dual seal, with polyisobutylene and silicone primary and secondary sealants.
   2. Spacer: Aluminum with mill or clear anodic finish.
   3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 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. Field-applied sealants shall have a VOC content of not more than 250 g/L.
   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. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 790.
      b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
      c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 290.
      d. Pecora Corporation; 890NST.
      e. Sika Corporation; SikaSil WS-290.

f. Tremco Incorporated; Spectrem 1.

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. Grind smooth and polish exposed glass edges and corners.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (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 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.

3.5 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.

3.6 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.

3.7 LOW-E COATED INSULATED GLASS

A. Glass Type CCL and "Insulated Glazing": Low-E-coated, clear insulating laminated glass.
   1. Basis-of-Design Product: Vitro Architectural Glass, Solarban 60.
   2. Overall Unit Thickness: 1 inch.
   3. Outdoor Lite: Low-E-coated, clear laminated glass with two plies of heat-strengthened float glass.
      a. Minimum Thickness of Each Glass Ply: 3 mm.
      b. Interlayer Thickness: 0.030 inch.
   4. Interspace Content: Air.
   5. Indoor Lite: Clear laminated glass with two plies of heat-strengthened float glass.
      a. Minimum Thickness of Each Glass Ply: 3 mm.
      b. Interlayer Thickness: 0.030 inch (0.76 mm.)
   6. Low-E Coating: Sputtered on second surface.
   7. Winter Nighttime U-Factor: 0.48 maximum.
   8. Summer Daytime U-Factor: 0.51 maximum.
   9. Visible Light Transmittance: 65 percent minimum.
   10. Solar Heat Gain Coefficient: 0.37 maximum.

B. For Type SG glass (as indicated on Drawings), provide glass Type CCL and "Insulated Glazing" as noted above, with Security Film specified in Section 088723

3.8 LAMINATED GLASS SCHEDULE

A. Glass Type LM and "Laminated Glazing": Clear laminated glass.
   1. Heat-Treated Laminated-Glass Units, Type 1
   2. Consisting of two lites of fully tempered float glass.
   3. Outer Lite: Clear laminated glass with two plies of heat-strengthened float glass.
      a. Fully Tempered Glass.
      b. Minimum Thickness of Each Glass Ply: 3 mm.
   4. Inner Lite: Clear laminated glass with two plies of heat-strengthened float glass.
      a. Fully Tempered Glass.
      b. Minimum Thickness of Each Glass Ply: 3 mm.
   5. Plastic Interlayer:
      a. Interlayer: Polyvinyl butyral of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
      b. Interlayer Color: Clear.

3.9 SPANDREL GLASS SCHEDULE

A. Glass Type SP and "Spandrel Glazing": Coated view-obscuring glass
   1. Monolithic Glass: Clear heat-treated fully tempered float glass.

a. Minimum Thickness: 6 mm.

2. Coating: Manufacturers recommended water based coating.
   a. Color: As selected from manufacturer's full range.
   b. Location: Second surface of monolithic glass.
3. Visible Light Reflectance: 60 percent maximum (exterior).
4. Shading Coefficient: 0.30 minimum.

END OF SECTION 088000

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SECTION 088723 - SECURITY FILMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes security film for the following applications:
   1. Doors.
   2. Windows.
   3. Glazed entrances.

1.3 DEFINITIONS

A. Filming Manufacturers: Firms that produce fabricated security films, as defined in referenced glazing/filming publications.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review temporary protection requirements for security films during and after installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Delegated-Design Submittal: For security film indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers, manufactures, and testing agencies.

B. Product Certificates: For each type of product indicated, from manufacturer.

C. Product Test Reports: For each type of security film, for tests performed by a qualified testing agency.

D. Preconstruction adhesion and compatibility test reports.

E. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glazing installers for this Project who are certified under the National Glass Association Glazier Certification Program.

B. Security Glazing Testing Agency Qualifications: Subject to compliance with requirements, testing agency is one of the following:
   1. H. P. White Laboratory, Inc.
   2. Underwriters Laboratories, Inc.
   3. Wiss, Janney, Elstner Associates, Inc.

C. ASTM F3561 - Standard Test Method for Forced-Entry-Resistance of Fenestration Systems After Simulated Active Shooter Attack, Resistance Level 1 (tested on 1/4-inch tempered glass.).
   1. Specimen sample shall be evaluated per the requirements of the ASTM F3561 Appendix for Glazing Only Weakening Testing – Non-System Test, as this method is not a systems test and therefore not a certified assembly.

D. FTD SA – Standard for Shooter Attack certification, Class 1 (tested on 1/4-inch tempered glass).

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect security film and film materials according to manufacturer's written instructions. Prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with filming when ambient and substrate temperature conditions are outside limits permitted by film material manufacturers and when glazing substrates are wet from rain, frost, condensation, or other causes.

1.10 WARRANTY

A. Manufacturer's Special Warranty on Security Film:
   1. Warranty Period: 10 years from date of Substantial Completion, minimum.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Security Film: Obtain security Film from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General:
   1. Installed security films shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing; or other defects in construction.
   2. Installed security films shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glazing framing members and glazing components.
   1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

2.3 SECURITY FILMS

A. For Type SG glass (as indicated on Drawings).

B. Security Glazing/Film Publications: Comply with published recommendations of security filming and filming material manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for terms not otherwise defined in this Section or in referenced standards.

C. Security Glazing Film: Installed on glazing assemblies to provide impact resistance and forced/attack resistance complying with FTD-SA-C1, ANSI Z97.1 and CPSC 16 CFR 1201 Category II.
   1. Basis of Design Product: Subject to compliance with requirements, provide Shooter Attack Certified 23 Mil. Security Film manufactured by Armoured One, or a comparable product by one of the following:
      a. 3M United States
      b. CJ Buffer
      c. Gaffco Ballistics
      d. Total Security Solutions

D. Film Materials: Surface-applied, clear, micro-layered, film for permanent bonding to glass.
   1. Thickness: 5/16" minimum.

2. Color: Clear.
3. Construction: Adhesive backed polystester film for permanent bond.
4. Adhesive Type: Pressure sensitive.
5. Tensile Strength: 35,000 psi minimum.
6. Breaking Strength: 640 lbs/inch minimum.
7. Elongation at Break: 230%
8. Surface Burning Characteristics: Flame spread index of 25 max. and smoke
9. developed index of 450 max., as tested in accordance with ASTM E84 (Class A).

2.4 GLAZING SEALANTS

A. General:
   1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they contact, including security glazing, seals of insulating security glazing and air-gap security glazing, 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 security glazing manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

B. Security Sealant: Neutral-curing, one-component, elastomeric adhesive specifically formulated for silicone structural glazing and protective glazing applications. silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced filming standard, requirements of manufacturers of security filming and other filiming materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine existing glazing scheduled to receive security glazing, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Minimum required face or edge clearances.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.

B. Blade the inside surface of window glass to ensure removal of foreign contaminants.

C. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.

D. Protect adjacent surfaces.

E. Do not begin installation until substrates have been properly prepared.

3.3 FILMING, GENERAL

A. Comply with combined written instructions of manufacturers of security films and other film materials unless more stringent requirements are indicated, including those in referenced glazing/filming publications.

B. Protect security films from damage during handling and installation. Remove damaged security films from Project site and legally dispose of off Project site. Damaged security films includes units with damage or other imperfections that, when installed, could weaken or impair performance and appearance.

3.4 INSTALLATION

A. Install in accordance with manufacturer's instructions as required to achieve specified performance.

B. Seams:Seam film only as required to accommodate material sizes, seam without overlaps.

C. Seam orientation to be identified and coordinated during shop drawing review and verified in field prior to installation.

D. Apply bead of structural sealant overlapping 3/8-inch to 1/2-inch of the exposed edge of film and overlapping equally onto the glazing system frame. Allow to cure before cleaning.

E. Clean glass and excess structural sealants from finished surfaces.

F. Remove any labels or protective covers. Do not encapsulate anything under the film.

3.5 CLEANING AND PROTECTION

A. Immediately after installation remove non-permanent labels and clean surfaces.

B. Protect security films from contact with contaminating substances resulting from construction operations, including weld splatter.
   1. If, despite such protection, contaminating substances do come into contact with security films, remove substances immediately as recommended in writing by security film manufacturer. Remove and replace security films that cannot be cleaned without damage.

C. Wash fully installed security films in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash security films as recommended in writing by security film manufacturer.

END OF SECTION 088723

SECTION 088813 - FIRE-RESISTANT GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Fire-protection-rated glazing.

1.3 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 C 1036.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product; 12 inches (300 mm) square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers and glass testing agency.

B. Product Certificates: For each type of glass and glazing product, from manufacturer.

C. Sample Warranties: For special warranties.

1.7 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.

1.8 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.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during the remainder of the construction period.

1.10 WARRANTY

A. Manufacturer's Special Warranty on Double Glazing Units with Clear Gel Fill: Manufacturer agrees to replace units that deteriorate within specified warranty period. Deterioration of double glazing units with clear gel fill is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning glass contrary to manufacturer's written instructions. Evidence of failure is the leakage of gel fill from units, air bubbles within units, or obstruction of vision by contamination or deterioration of gel.
   1. Warranty Period: 10 years from date of Substantial Completion.

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 impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: "Glazing Manual."

B. Safety Glazing Labeling: Permanently mark glazing with certification label of the Safety Glazing Certification Council. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies. CPSC Cat. II required.

2.4 GLASS PRODUCTS

A. Ultraclear Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear), with visible light transmission not less than 91 percent.

B. Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to NFPA 257 or UL 9, including the hose-stream test, and shall comply with NFPA 80 and/or ASTM E119.
   1. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from the hose-stream test.

B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether or not glazing has passed the hose-stream test; whether or not glazing meets 450 deg F (250 deg C) temperature-rise limitation; and the fire-resistance rating in minutes.

C. Double Glazing Units with Clear Gel Fill: Double glazing units made from two lites of uncoated, fully tempered, ultraclear float glass; with a perimeter edge seal enclosing a cavity filled with optically clear, intumescent gel; and complying with 16 CFR 1201, Category II.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide SAFTI FIRST Fire Rated Glazing Solutions; SuperLite II-XL or equal.
   2. Glass rating based on wall or door rating.

2.6 GLAZING ACCESSORIES

A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.

B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
   1. Sealants shall have a VOC content of 250 g/L or less.
   2. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

C. 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.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, 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. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

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.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.

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 fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.

B. 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.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. 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.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. 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.

H. 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.

I. Set glass lites with proper orientation so that coatings face fire side or protected side 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

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 and then to jambs. Cover horizontal framing joints by applying tapes to jambs and 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. 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.

D. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances. 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 washaway 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.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 FIRE-PROTECTION-RATED GLAZING SCHEDULE

A. Glass Type 'FR': Fire rated, clear glass.
   1. 20-minute, 45-minute and 60-minute fire-protection-rated glazing with 450 deg F (250 deg C) temperature-rise limitation; double glazing units with clear gel fill.

END OF SECTION 088813

SECTION 088853 - SECURITY GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes security glass for the following applications:
   1. Doors.
   2. Glazed entrances.

1.3 DEFINITIONS

A. Glazing Manufacturers: Firms that produce primary glass, monolithic plastic glazing, or fabricated security glazing, as defined in referenced glazing publications.

B. Interspace: Space between lites of air-gap security glazing or insulating security glazing.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on security glazing, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review temporary protection requirements for security glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Security Glazing Samples: For each type of security glazing; 12 inches (300 mm) square.

C. Glazing Accessory Samples: For sealants and colored spacers, in 12 inch (300 mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Security Glazing Schedule: List security glazing types and thicknesses for each size opening and location. Use same designations indicated on Drawings. Indicate coordinated dimensions of security glazing and construction that receives security glazing, including clearances and glazing channel dimensions.

E. Delegated-Design Submittal: For security glazing indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers, manufactures, and testing agencies.

B. Product Certificates: For each type of product indicated, from manufacturer.

C. Product Test Reports: For each type of security glazing, for tests performed by a qualified testing agency.

D. Product Test Reports: For each type of glazing sealant, for tests performed by a qualified testing agency.
   1. Provide test reports based on testing current sealant formulations within previous 36-month period.

E. Preconstruction adhesion and compatibility test reports.

F. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glazing installers for this Project who are certified under the National Glass Association Glazier Certification Program.

B. Security Glazing Testing Agency Qualifications: Subject to compliance with requirements, testing agency is one of the following:
   1. H. P. White Laboratory, Inc.
   2. Underwriters Laboratories, Inc.
   3. Wiss, Janney, Elstner Associates, Inc.

C. Sealant Testing Agency Qualifications: Qualified according to ASTM C1021 for testing indicated.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each security glazing type, tape sealant, gasket, glazing accessory, and glazing-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing will not be required if data based on previous testing of current sealant products and glazing materials match those submitted.
   2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to security glazing, tape sealants, gaskets, and glazing channel substrates.
   3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
   4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect security glazing and glazing materials according to manufacturer's written instructions. Prevent damage from condensation, temperature changes, direct exposure to sun, or other causes.

1.11 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 below 40 deg F (4.4 deg C).

1.12 WARRANTY

A. Manufacturer's Special Warranty on Security Glass: Manufacturer agrees to replace security glass that deteriorates within specified warranty period. Deterioration of security glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning security glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced standard.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Security Glazing: Obtain security glazing from single source from single manufacturer using the same types of lites, plies, films, interlayers, and spacers for each security glazing type indicated.

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:
   1. Installed security glazing shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing; or other defects in construction.
   2. Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design security glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the 2015 IBC and ASTM E 1300.
   1. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glazing framing members and glazing components.
   1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 SECURITY GLAZING, GENERAL

A. Glazing Publications: Comply with published recommendations of security glazing and glazing material manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: “Glazing Manual."
   2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Plastic Glazing Labeling: Identify plastic sheets with appropriate markings of applicable testing and inspecting agency, indicating compliance with required fire-test-response characteristics.

C. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glazing, glass thickness, and safety glazing standard with which glazing complies.

D. Insulating Glazing Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council.

E. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

F. Fire-Test-Response Characteristics of Polycarbonate Sheets: As determined by testing polycarbonate sheets identical to those used in security glazing products by a qualified testing agency acceptable to authorities having jurisdiction.
   1. Self-ignition temperature of 650 deg F or more when tested according to ASTM D1929 on plastic sheets in thicknesses indicated for the Work.
   2. Smoke-Developed Index of 450 or less when tested according to ASTM E84, or smoke density of 75 or less when tested according to ASTM D2843 on plastic sheets in thicknesses indicated for the Work.
   3. Burning extent of 1 inch or less when tested according to ASTM D635 at a nominal thickness of 0.060 inch or thickness indicated for the Work.

G. Thermal and Optical Performance Properties: Provide security glazing with performance properties specified, as indicated in manufacturer's published test data, based on construction products indicated and on procedures indicated below:
   1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
   2. Solar-Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
   3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.

B. Float Glass: ASTM C1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

C. Heat-Treated Float Glass: ASTM C1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

2.5 BALLISTIC-RATED GLAZING

A. For Type BR and "Ballistic-Rated" glass (as indicated on Drawings)
1. Basis of Design Product: Subject to compliance with requirements, provide 5/16 inch Laminated Security Glass manufactured by Armoured One, or a comparable product by one of the following:
a. DefenseLite.
b. Gaffco Ballistics.
c. Patriot Armor.

B. Glazing Components:
1. 5/16 inch overall thickness.
a. Threat Side Coating: Specified Security Film.
b. Threat Side Glazing: Clear Glass (as required for assembly).
c. Interlayer: Manufacturer’s Standard Security Interlayer.
d. Secure Side Glazing: Clear Glass (as required for assembly).

2.6 FIRE-RATED BALLISTIC-RATED GLAZING

A. For Type FRBR and "Fire-Rated Ballistic-Rated" glass (as indicated on Drawings)
1. Basis of Design Product: Subject to compliance with requirements, provide 1 inch 60-Minute Fire-Rated Security Glass manufactured by Armoured One, or a comparable product by one of the following:
a. DefenseLite.
b. Gaffco Ballistics.
c. Patriot Armor.

B. Glazing Components:
1. 1 inch overall thickness.
a. Threat Side Coating: Specified Security Film.
b. Threat Side Glazing: Clear Glass (as required for assembly).
c. Interlayer: Manufacturer’s Standard Security Interlayer.
d. Secure Side Glazing: Clear Glass (as required for assembly).

2.7 BALLISTIC-RATED INSULATED GLAZING

A. For Type BRIG and “Ballistic-Rated Insulated” glass (as indicated on Drawings)
1. Basis of Design Product: Subject to compliance with requirements, provide 1 inch Insulated Security Glass Unit manufactured by Armoured One, or a comparable product by one of the following:
a. DefenseLite.
b. Gaffco Ballistics.
c. Patriot Armor.

B. Glazing Components:
   1. 1 inch overall thickness.
      a. Threat Side Coating: Specified Security Film.
      b. Threat Side Glazing: Clear Glass (as required for assembly).
      c. Air Gap: Filled with Argon Gas
      d. Interlayer: Manufacturer’s Standard Security Interlayer.
      e. Secure Side Glazing: Clear Glass (as required for assembly).

C. Anchoring System: Provide supplemental anchoring system as required to meet forced entry resistance requirements.
   1. DOW 995 or GE SCS2000 SilPruf Structural Sealant with high impact styrene trim.

2.8 GLAZING SEALANTS

A. General:
   1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they contact, including security glazing, seals of insulating security glazing and air-gap security glazing, 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 security glazing manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
   3. Field-applied sealants shall have a VOC content of not more than 250 g/L.
   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 C920, Type S, Grade NS, Class 100/50, Use NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 790.
      b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
      c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 290.
      d. Pecora Corporation; 890NST.
      e. Sika Corporation; SikaSil WS-290.
      f. Tremco Incorporated; Spectrem 1.

C. Security Sealant: Manufacturer's standard, non-sag, tamper-resistant sealant for joints with low movement complying with ASTM C920, Grade NS, Class 12.5 or 25, Use NT, and with a Shore A hardness of at least 45 when tested according to ASTM C661.

2.9 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; non-staining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and security glazing manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
   1. AAMA 810.1, Type 1, for glazing applications in which tape acts as 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.

2.10 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of security glazing 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 security glazing manufacturer to maintain security glazing lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit security glazing lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.11 FABRICATION OF SECURITY GLAZING

A. Fabricate security glazing 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.

B. Grind smooth and polish exposed security glazing edges and corners.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine framing for security glazing, 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 system.
   3. Minimum required face or edge clearances.
   4. Minimum required bite.
   5. Effective sealing between joints of 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 security glazing 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 will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of security glazing, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect edges of security glazing from damage during handling and installation. Remove damaged security glazing from Project site and legally dispose of off Project site. Damaged security glazing includes units with edge or face damage or other imperfections that, when installed, could weaken security glazing and impair performance and 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 glazing unit manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by security glazing manufacturers for installing lites.

F. Provide spacers for security glazing lites where the length plus width is larger than 50 inches (1270 mm).
   1. Locate spacers directly opposite each other on both inside and outside faces of security glazing. 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 performance requirements.
   2. Provide 1/8-inch (3-mm) minimum bite of spacers on glazing lites 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 security glazing from moving sideways in glazing channel, as recommended in writing by security glazing manufacturer and according to requirements in referenced glazing publications.

H. Set security glazing in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set coated security glazing with proper orientation so that coatings and films 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

A. Position tapes on fixed stops so that, when compressed by security glazing, 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 and then to jambs. Cover horizontal framing joints by applying tapes to jambs and 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 just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center security glazing in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket securely in place between glazing unit 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 security glazing 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 security glazing. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center security glazing 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 security glazing. 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 security glazing and glazing stops to maintain face clearances and to prevent sealant from extruding into glazing channel and blocking weep systems. 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 security glazing and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from security glazing.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove non-permanent labels and clean surfaces.

B. Protect security glazing from contact with contaminating substances resulting from construction operations, including weld splatter. 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 security glazing, remove substances immediately as recommended in writing by security glazing manufacturer. Remove and replace security glazing that cannot be cleaned without damage.

C. Wash security glazing on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash security glazing as recommended in writing by security glazing manufacturer.

END OF SECTION 088853

SECTION 089119 - FIXED LOUVERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fixed extruded-aluminum louvers.
   2. Screening for louvers.

1.2 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axis of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven-rain performance, as determined by testing in accordance with AMCA 500-L.

F. Windborne-Debris-Impact-Resistant Louver: Louver that provides specified windborne-debris-impact resistance, as determined by testing in accordance with AMCA 540.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
   1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
   2. Show mullion profiles and locations.

C. Samples: For each type of metal finish required.

D. Delegated Design Submittal: For louvers indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed in accordance with AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

B. Windborne-debris-impact-resistance test reports.

C. Sample Warranties: For manufacturer's special warranties.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 WARRANTY

A. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: 10 years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
      c. Cracking, peeling, or chipping.
   2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fixed louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural performance requirements and design criteria indicated.

B. Structural Performance: Louvers withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures are considered to act normal to the face of the building.
   1. Wind Loads:
      a. Determine loads based on pressures as indicated on Drawings.

C. Windborne-Debris-Impact Resistance: Louvers located within 30 feet of grade pass basic protection, when tested in accordance with AMCA 540.

D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width in accordance with AMCA 500-L.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

F. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Drainable-Blade Louver, Extruded Aluminum:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide products by Ruskin Louvers and Architectural Solutions, or a comparable product by one of the following:
      a. Aire Technologies, Inc.
      b. Industrial Louvers, Inc.
      c. Reliable Products
      d. United Enertech Corp.
   2. Louver Depth: 4 inches minimum.
   3. Frame and Blade Nominal Thickness: Not less than 0.080 inch.
   4. Mullion Type: Exposed.
   5. Finish: As selected by Architect from manufacturer's full range of finishes.
   6. Accessories: Universal sleeves.
   7. Louver Performance Ratings:
      a. Free Area: As indicated on Drawings.
      b. Point of Beginning Water Penetration: Not less than 900 fpm.
      c. Air Performance:
         1) Not more than 0.15-inch wg static pressure drop at 1000-fpm free-area velocity.
   8. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.
   1. Screen Location for Fixed Louvers: Interior face.
   2. Screening Type: Insect screening.

B. Secure screen frames to louver frames with machine screws with heads finished to match louver, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
   1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
   2. Finish: Same finish as louver frames to which louver screens are attached.

D. Louver Screening for Aluminum Louvers:
   1. Insect Screening, Aluminum: 18-by-16 mesh, 0.012-inch wire.

2.5 BLANK-OFF PANELS

2.6 MATERIALS

A. Aluminium Extrusions: ASTM B221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B209, Alloy 3003 or 5005, with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Fasteners: Use types and sizes to suit unit installation conditions.
   1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
   2. For fastening aluminum, use aluminum or 300 series stainless steel fasteners.
   3. For fastening galvanized steel, use hot-dip-galvanized-steel or 300 series stainless steel fasteners.
   4. For fastening stainless steel, use 300 series stainless steel fasteners.
   5. For color-finished louvers, use fasteners with heads that match color of louvers.

D. Post-installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless steel components, with allowable load or strength design capacities calculated in accordance with ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing in accordance with ASTM E488/E488M conducted by a qualified testing agency.

2.7 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
   1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.
   2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.

C. Maintain equal louver blade spacing to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
   1. Frame Type: Exterior flange, unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
2. Exterior Corners: Prefabricated corner units with mitered and welded blades.

G. Provide subsills made of same material as louvers or extended sills for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
1. Color: As selected by Architect from full range of industry colors and color densities.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
   1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089119

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SECTION 090561.13 - MOISTURE VAPOR EMISSION CONTROL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Fluid-applied, resin-based, membrane-forming systems that control the moisture-vapor-emission rate of high-moisture, interior concrete to prepare it for floor covering installation.

1.3 DEFINITIONS

A. MVE: Moisture vapor emission.

B. MVER: Moisture vapor emission rate.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each MVE-control system, for tests performed by a qualified testing agency.

C. Preinstallation testing reports.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Employs factory-trained personnel who are available for consultation and Project-site inspection.

B. Installer Qualifications: An authorized representative who is trained and approved by the manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Comply with MVE-control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.
   1. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature of not less than 65 deg F and not more than 85 deg F at least 48 hours before use.
   2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE-control system manufacturer, but not less than 65 deg F or more than 85 deg F and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.
   3. Install MVE-control systems where concrete surface temperatures will remain a minimum of 5 deg F higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. MVE-Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:
   1. MVER: Maximum 15 lb of water/1000 sq. ft. when tested according to ASTM F1869.
   2. Relative Humidity: Maximum 100 percent when tested according to ASTM F2170 using in situ probes.

B. Water-Vapor Transmission: Through MVE-control system, maximum 0.10 perm when tested according to ASTM E96/E96M.

C. Tensile Bond Strength: For MVE-control system, greater than 300 psi with failure in the concrete according to ASTM D7234.

2.2 MVE-CONTROL SYSTEM

A. Manufacturer:
   1. Basis of Design: Provide Vapor Ban ER moisture vapor barrier manufactured by Laticrete International, Inc. or an approved product manufactured by one of the following:
      a. Ardex Americas
      b. Mapei Corporation
      c. Maxxon, Inc.
      d. USG Corporation

B. MVE-Control System: ASTM F3010-qualified, fluid-applied, two-component, epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives.
   1. Substrate Primer: Provide MVE-control system manufacturer's concrete-substrate primer if required for system indicated by substrate conditions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Installation of system indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Preinstallation Testing:
   1. Testing Agency: Engage a qualified testing agency to perform tests.
   2. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Internal Relative Humidity Test: Using in situ probes, ASTM F2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.
   3. Tensile-Bond-Strength Testing: For typical locations indicated to receive installation of MVE-control system, install minimum 100-sq. ft. area of MVE-control system to prepared concrete substrate and test according to ASTM D7234.
      a. Proceed with installation only where tensile bond strength is greater than 300 psi with failure in the concrete.

B. Concrete Substrates: Prepare and clean substrates according to MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.
   1. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
   2. Provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
   3. After shot blasting, repair damaged and deteriorated concrete according to MVE-control system manufacturer's written instructions.
   4. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
   5. Fill surface depressions and irregularities with patching and leveling material.
   6. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack-filling material.
   7. Allow concrete to dry, undisturbed, for period recommended in writing by MVE-control system manufacturer after surface preparation, but not less than 24 hours.
   8. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.

C. Protect walls, floor openings, electrical openings, door frames, and other obstructions during installation.

3.3 INSTALLATION

A. Install MVE-control system according to ASTM F3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.
   1. Install primers as required to comply with manufacturer's written instructions.

B. Do not apply MVE-control system across substrate expansion, isolation, and other moving joints.

C. Apply system, including component coats if any, in thickness recommended in writing by MVE-control system manufacturer for MVER indicated by preinstallation testing.

D. Cure MVE-control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.

E. After curing, examine MVE-control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform installation inspections.

B. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE-control system is installed without deficiencies.
   1. Verify that surface preparation meets requirements.
   2. Verify that component coats and complete MVE-control-system film thicknesses comply with manufacturer's written instructions.
   3. Verify that MVE-control-system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.

3.5 PROTECTION

A. Protect MVE-control system from damage, wear, dirt, dust, and other contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE-control system manufacturer.

B. Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or otherwise compromise the MVE-control system membrane.

END OF SECTION 090561.13

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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes non-load-bearing steel framing members for the following applications:
   1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.)
   2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.)

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

PART 2 PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
   2. Protective Coating: ASTM A 653/A 653M, G60, hot-dip galvanized, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625 inch diameter wire, or double strand of 0.0475 inch diameter wire.

B. Hanger Attachments to Concrete:
   1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
      a. Type: Cast-in-place anchor, designed for attachment to concrete forms; postinstalled, chemical anchor; and postinstalled, expansion anchor.
   2. 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 E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162 inch diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2 inch wide flanges.
   1. Depth: 2 inches.

F. Furring Channels (Furring Members):
   1. Cold-Rolled Channels: 0.0538 inch bare-steel thickness, with minimum 1/2 inch wide flanges, 3/4 inch deep.
   2. Steel Studs: ASTM C 645.
      a. Minimum Base-Metal Thickness: 18 Gauge (0.0403 inch).
      b. Depth: As indicated on Drawings.
   3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
      a. Minimum Base Metal Thickness: 20 Gauge (0.0359 inch).
   4. Resilient Furring Channels: 1/2 inch deep members designed to reduce sound transmission.
      a. Configuration: Asymmetrical or hat shaped.

G. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Armstrong World Industries, Inc.; Drywall Grid Systems.
      b. Chicago Metallic Corporation; Drywall Furring System.
      c. USG Corporation; Drywall Suspension System.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. Steel Studs and Runners: ASTM C 645.
   1. Minimum Base-Metal Thickness: 18 Gauge (0.0403 inch).
   2. Depth: As indicated on Drawings.

B. Slip-Type Head Joints: Where indicated, provide one of the following:
   1. Single Long-Leg Runner System: ASTM C 645 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 C 645 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. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
      a. Products: Subject to compliance with requirements, provide one of the following:
         1) Steel Network Inc. (The); VertiClip SLD and/or VertiTrack VTD Series.
         2) Superior Metal Trim; Superior Flex Track System (SFT).

C. 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.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   2. Products: Subject to compliance with requirements, provide one of the following:
      a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
      b. Metal-Lite, Inc.; The System.

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Metal Thickness: 20 Gauge (0.0359 inch).

E. Cold-Rolled Channel Bridging: 0.0538 inch bare-steel thickness, with minimum 1/2 inch wide flanges.
   1. Depth: 1-1/2 inches.
   2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068 inch thick, galvanized steel.

F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base Metal Thickness: 20 Gauge (0.0359 inch).
   2. Depth: 7/8 inch.

G. Resilient Furring Channels: 1/2 inch deep, steel sheet members designed to reduce sound transmission.
   1. Configuration: Asymmetrical or hat shaped.

H. Cold-Rolled Furring Channels: 0.0538 inch bare-steel thickness, with minimum 1/2 inch wide flanges.
   1. Depth: 3/4 inch.
   2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 20 Gauge (0.0359) inch.
   3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch diameter wire, or double strand of 0.0475-inch- diameter wire.

I. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare-metal thickness of 24 Gauge (0.0239 inch), and depth required to fit insulation thickness indicated. Provide custom sized furring in 1/2", 3/4" or 1" sizes to meet specific assembly thicknesses shown on details in the contract documents.

J. Stud Wall Reinforcing Steel (Tube and Base Plate):
   1. Provide heavy gauge steel manufactured product for reinforcing:
      a. Low walls of metal framing that are 3'-0" to 6'-0" in height.
      b. Metal framing at door jambs and strikes.
   2. Steel base plate metal thickness: 3/8 inch.
   3. Steel base plate dimensions: 3 inches x 8 inches with three holes for 1/2 inch diameter bolts.
   4. Size of vertical steel tube: 2 inch x 1 inch x 14 Gauge steel tube.
   5. Height of vertical steel tube: 34-1/2 inches.
   6. Vertical steel tube location on plate: Tube is at one end of base plate to brace low wall and offset on plate to allow conduits to pass by within reinforced low wall.
   7. Spacing for 3 ft high low wall: 6 ft. on center.
   8. Spacing for 4 ft. high low wall: 4 ft. on center.
   9. Spacing for 5 ft. high low wall: 4 ft. on center.
   10. Spacing for 6 ft. high low wall: 4 ft. on center.
   11. Base plate is secured to concrete floor slab with 1/2 inch diameter steel bolt fasteners with 3-1/2 inch minimum embedment.
   12. Manufacturer and Product:
      a. NoFlex, Inc; NoFlex - The Low Wall Support Solution (Basis-of-Design)
         1) NoFlex, Inc.
         2) 9121 Atlanta Avenue, Suite 333
         3) Huntington Beach, California 92646
         4) Ph: (800) 720-1994
         5) www.noflex.com
      b. b. Approved equal.

K. Extruded Aluminum Partition Closure: Provide specified lengths and size to fit specified openings.
   1. Material: Extruded aluminum, 6063-T5
   2. Finish: Factory-anodized in clear or medium bronze.
   3. Provide acoustic insulation (as specified) within concealed mullion chassis.
   4. Manufacturer and Product:
      a. Gordon, Inc.
         1) 5023 Hazel Jones Road
         2) Bossier City, LA 71111
         3) Ph: (800) 747-8954
         4) Website: www.gordoninteriors.com
      b. Or Approved equal.
   5. Basis of Design:
      a. Terminations at Glass – Mullion Mate Series 40, or Approved Equal
      b. Terminations at Mullions – Mullion Mat Series 30, or Approved Equal
   6. Partition Wall End Caps: Extruded aluminum end caps. Sized to fit partition or wall assembly.
      a. AUXILIARY MATERIALS

L. General: Provide auxiliary materials that comply with referenced installation standards.
   1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

M. Isolation Strip at Exterior Walls: Provide the following:
   1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
   1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
   2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
   3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
   4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING 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.

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. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.5 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.
1. Space studs as follows:
a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
b. Multilayer Application: 16 inches o.c., unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
    a. Install two studs at each jamb, unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2 inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

D. Direct Furring:
1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

E. Z-Furring Members:
1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.
4. Install custom furring over support framing as shown in the details in the contract documents.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Gypsum board for wall panels, soffits, and ceilings.

B. Related Requirements:
   1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
   2. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Gypsum wallboard.
   2. Gypsum board, Type X.
   3. Abuse-resistant gypsum board.
   4. Impact-resistant gypsum board.
   5. Mold-resistant gypsum board.
   6. Glass-mat interior gypsum board.
   7. Glass-mat gypsum sheathing board.
   8. Interior trim.
   9. Exterior trim.
   10. Aluminum trim.
   11. Joint treatment materials.
   12. Laminating adhesive.

B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

C. Samples: For the following products:
   1. Trim Accessories: Full-size Sample in 12-inch long length for each trim accessory indicated.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.3 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. American Gypsum Co.
      b. BPB America Inc.
      c. G-P Gypsum.
      d. Lafarge North America Inc.
      e. National Gypsum Company.
      f. PABCO Gypsum.
      g. Temple.
      h. USG Corporation.

B. Gypsum Board, Ceiling Panels: ASTM C1396/C1396M.
   1. Locations: Gypsum Board Ceilings in Classrooms, Offices, Prep Rooms, Storage Rooms, Corridors, Mechanical Rooms, Electrical Rooms, and Maintenance Rooms.
   2. Thickness: 1/2 inch, regular type.
   3. Long Edges: Tapered.

C. Gypsum Board, Type X Wall Panels: ASTM C1396/C1396M.
   1. Locations: Gypsum Board Ceilings in Classrooms, Offices, Prep Rooms, and Storage Rooms.
   2. Thickness: 5/8 inch, type X.
   3. Long Edges: Tapered
   4. Fire resistance: Core material shall be specially formulated for a type X classification as defined in ASTM C36. Board material shall exhibit a 15 flame spread, as manufactured, per ASTM E84.

D. Gypsum Board, Abuse-Resistant Type X Wall Panels: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
   1. Locations: Corridors, Mechanical Rooms, Electrical Rooms, and Maintenance Rooms.
   2. Core: 5/8 inch, type X.
   3. Long Edges: Tapered.
   4. Abuse resistance: Board surface facing occupied space shall have a special heavy duty paper or inorganic facing specially designed to resist abrasion, scratching, indentation and puncture. The board core shall be specially formulated with inorganic binders to achieve a higher bending strength and resistance to soft body impact.
   5. Fire resistance: Core material shall be specially formulated for a type X classification as defined in ASTM C36. Board material shall exhibit a 15 flame spread, as manufactured, per ASTM E84.

2.5 SPECIALTY GYPSUM BOARD

A. Glass-Mat Interior Gypsum Board, Ceiling Panels: ASTM C1658/C1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
   1. Locations: Kitchens, Pools, Locker Rooms, and Toilet Rooms.
   2. Core: 1/2 inch, regular type.
   3. Long Edges: Tapered.
   4. Mold & Mildew Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

B. Glass-Mat Interior Gypsum Board, Tile Backer Panels: ASTM C1658/C1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
   1. Locations: Kitchens, Pools, Locker Rooms, and Toilet Rooms, where tile finish is scheduled over gypsum board.
   2. Core: 1/2 inch, regular type.
   3. Long Edges: Tapered.
   4. Mold & Mildew Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

C. Glass-Mat Interior Gypsum Board, Type X Wall Panels: ASTM C1658/C1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
   1. Locations: Kitchens, Pools, Locker Rooms, and Toilet Rooms, where finishes other than tile are scheduled over gypsum board.
   2. Core: 5/8 inch, type X.
   3. Long Edges: Tapered.
   4. Mold & Mildew Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
   5. Fire resistance: Core material shall be specially formulated for a type X classification as defined in ASTM C36. Board material shall exhibit a 15 flame spread, as manufactured, per ASTM E84.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.
   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
   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.

h. Base-of-Wall Galvanized Moisture Barrier Trim: Galvanized-steel sheet, 2 inches high.

B. Exterior Trim: ASTM C1047.
1. Material: Hot-dip galvanized-steel sheet, plastic, or rolled zinc.
2. Shapes:
a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.
c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, Alloy 6063-T5.
2. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:
1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use drying-type, all-purpose 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.

D. Joint Compound for Exterior Applications:
1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:
   1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
   2. Cementitious Backer Units: As recommended by backer unit manufacturer.
   3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
   1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

D. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4 to 3/8 inch wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4 to 1/2 inch wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. 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.

B. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

C. 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 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.

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. L-Bead: Use where indicated on Drawings.
   4. LC-Bead: Use at exposed panel edges.

D. Exterior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners.
   2. LC-Bead: Use at exposed panel edges.

E. Aluminum Trim: Install in locations indicated on Drawings.

3.5 FINISHING OF GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and 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: Where indicated on Drawings.
   4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
   5. Level 5: Where indicated on Drawings.

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.6 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 092900

SECTION 093013 - CERAMIC AND QUARRY TILING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Ceramic tile for floors and walls.
   2. Quarry tile for floors.
   3. Thresholds.
   4. Tile backing panels.
   5. Waterproof membranes.
   6. Setting materials.

B. Related Requirements:
   1. Section 079200 Joint Sealants for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.2 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Face Size: Actual tile size, excluding spacer lugs.

C. Module Size: Actual tile size plus joint width indicated.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

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.

C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.

D. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory.
4. Stone thresholds in 6-inch lengths.
5. Metal edge strips in 6-inch lengths.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product.

D. Product Test Reports: For tile-setting and grouting products.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:
1. Installer is a member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
   1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
   1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
   2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
   1. Stone thresholds.
   2. Waterproof membrane.
   3. Crack isolation membrane.
   4. Cementitious backer units.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard grade requirements.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
   1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS

A. Ceramic Floor Tile (CFT):
   1. Basis of Design: Provide products by the manufacturers indicated on the drawings Subject to compliance with requirements, and subject to color and other aesthetic approval at the sole discretion of the Architect, other available manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
      a. American Marazzi Tile, Inc.
      b. American Olean; Division of Dal-Tile International Inc.
      c. Best Tile
      d. Daltile; Division of Dal-Tile International, Inc.
      e. Florida Tile Industries, Inc.
      f. Florim USA
      g. Laufen
      h. Mosa USA
      i. Portobello America, Inc.
      j. Seneca Tiles, Inc.
      k. United States Ceramic Tile Company
      l. Or Approved Equal
   2. Style: As indicated in the drawings.
   3. Module Size: As indicated on the drawings.
   4. Thickness: Per style indicated on the drawings.
   5. Finish: Per style indicated on the drawings.

6. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
7. Grout Color: As selected by Architect from manufacturer's full range.
8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile.

B. Ceramic Tile Base (CTB):
1. Basis of Design: Provide products by the manufacturers indicated on the drawings Subject to compliance with requirements, and subject to color and other aesthetic approval at the sole discretion of the Architect, other available manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
   a. American Marazzi Tile, Inc.
   b. American Olean; Division of Dal-Tile International Inc.
   c. Best Tile
   d. Daltile; Division of Dal-Tile International, Inc.
   e. Florida Tile Industries, Inc.
   f. Florim USA
   g. Laufen
   h. Mosa USA
   i. Portobello America, Inc.
   j. Seneca Tiles, Inc.
   k. United States Ceramic Tile Company
   l. Or Approved Equal
2. Style: As indicated in the drawings.
3. Module Size: As indicated on the drawings.
4. Thickness: Per style indicated on the drawings.
5. Finish: Per style indicated on the drawings.
6. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
7. Grout Color: As selected by Architect from manufacturer's full range.
8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile.

C. Ceramic Wall Tile (CWT):
1. Basis of Design: Provide products by the manufacturers indicated on the drawings Subject to compliance with requirements, and subject to color and other aesthetic approval at the sole discretion of the Architect, other available manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
   a. American Marazzi Tile, Inc.
   b. American Olean; Division of Dal-Tile International Inc.
   c. Best Tile
   d. Daltile; Division of Dal-Tile International, Inc.
   e. Florida Tile Industries, Inc.

f. Florim USA
g. Laufen
h. Mosa USA
i. Portobello America, Inc.
j. Seneca Tiles, Inc.
k. United States Ceramic Tile Company
l. Or Approved Equal

2. Module Size: As indicated on the drawings.
3. Thickness: Per style indicated on the drawings.
4. Finish: Per style indicated on the drawings.
5. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
6. Grout Color: As selected by Architect from manufacturer's full range.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile.

D. Quarry Floor Tile (QFT):
1. Basis of Design: Provide products by the manufacturers indicated on the drawings Subject to compliance with requirements, and subject to color and other aesthetic approval at the sole discretion of the Architect, other available manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
a. American Marazzi Tile, Inc.
b. American Olean; Division of Dal-Tile International Inc.
c. Best TileDaltile; Division of Dal-Tile International, Inc.
d. Florida Tile Industries, Inc.
e. Florim USA
f. Laufen
g. Mosa USA
h. Portobello America, Inc.
i. Seneca Tiles, Inc.
j. United States Ceramic Tile Company
k. Or Approved Equal
l. Style: As indicated in the drawings.
2. Module Size: As indicated on the drawings.
3. Thickness: Per style indicated on the drawings.
4. Finish: Per style indicated on the drawings.
5. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
6. Grout Color: As selected by Architect from manufacturer's full range.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile.

E. Accessories: Provide vitreous china accessories of type and size indicated, suitable for installing by same method as used for adjoining wall tile.

2.4 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
   1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

B. Marble Thresholds: ASTM C503/C503M, with a minimum abrasion resistance of 10 according to ASTM C1353 or ASTM C241/C241M and with honed finish.
   1. Description:
      a. Uniform, fine to medium grained white stone with gray veining.

2.5 WATERPROOF MEMBRANES

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Waterproof Membrane, Fluid-Applied: Liquid-latex rubber or elastomeric polymer.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Hydro Ban Single Component, Self-Curing, Fluid-Applied from Laticrete, or comparable product by one of the following:
      a. Boiardi Products; a QEP company
      b. Bonsal American; an Oldcastle company
      c. Bostik, Inc.
      d. C-Cure
      e. Custom Building Products
      f. Jamo Inc.
      g. MAPEI Corporation
      h. Southern Grouts & Mortars, Inc
      i. TEC; a subsidiary of H. B. Fuller Company
      j. Or Approved Equal

2.6 SETTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide 254 Platinum Thin Set Mortar from Laticrete, or comparable product by one of the following:
      a. Boiardi Products; a QEP company.
      b. Bonsal American; an Oldcastle company.
      c. Bostik, Inc.
      d. C-Cure.

e. Custom Building Products.
f. Jamo Inc.
g. MAPEI Corporation.
h. Mer-Kote Products, Inc.
i. Southern Grouts & Mortars, Inc.
j. Summitville Tiles, Inc.
k. TEC; a subsidiary of H. B. Fuller Company.
l. Or Approved Equal

2. Locations: All tile wall locations, unless otherwise noted.
3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
4. For wall applications, provide non-sag latex modified thin set mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15T.
   a. Polymer-Portland Cement Mortar (Fortified): ANSI A118.4.
5. Basis-of-Design Product: Subject to compliance with requirements, provide 3701 Fortified Mortar Bed from Laticrete, or comparable product by one of the following:
   a. Boiardi Products; a QEP company.
   b. Bonsal American; an Oldcastle company.
   c. Bostik, Inc.
   d. C-Cure.
   e. Custom Building Products.
   f. Jamo Inc.
   g. MAPEI Corporation.
   h. Mer-Kote Products, Inc.
   i. Southern Grouts & Mortars, Inc.
   j. Summitville Tiles, Inc.
   k. TEC; a subsidiary of H. B. Fuller Company.
   l. Or Approved Equal
6. Locations: All floor tile locations, unless otherwise noted.
7. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.

2.7 GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Spectralock Pro Premium Grout from Laticrete, or comparable product by one of the following:
      a. Atlas Minerals & Chemicals, Inc.
      b. Boiardi Products; a QEP company.

c. Bonsal American; an Oldcastle company.
d. Bostik, Inc.
e. C-Cure.
f. Custom Building Products.
g. Jamo Inc.
h. MAPEI Corporation.
i. Mer-Kote Products, Inc.
j. Southern Grouts & Mortars, Inc.
k. Summitville Tiles, Inc.
l. TEC; a subsidiary of H. B. Fuller Company.
m. Or Approved Equal

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.

2.8 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."

1. Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
3. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
   a. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
   b. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior porcelain tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
4. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. DAP Inc.; 100 percent Silicone Kitchen and Bath Sealant.
   b. Dow Corning Corporation; Dow Corning 786.
   c. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
   d. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
   e. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
   f. Tremco Incorporated; Tremsil 600 White.

2.9 MISCELLANEOUS MATERIALS

A. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless steel, exposed-edge material.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.10 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
   2. Verify that concrete substrates for tile floors installed with adhesives, bonded mortar bed, or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
      a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
      b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
   3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
   4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer. Floor substrates shall be verified. If uneven floor substrates are encountered, leveling materials shall be provided to ensure new floor finishes do not require transitions between similar materials.

B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION OF CERAMIC TILE

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
   1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
      a. Exterior tile floors.
      b. Tile floors in wet areas.
      c. Tile swimming pool decks.
      d. Tile floors in laundries.
      e. Tile floors consisting of tiles 8 by 8 inches or larger.
      f. Tile floors consisting of rib-backed tiles.

B. 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.

C. 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.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. 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.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
   1. Ceramic Tile: 3/8 inch.

H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

J. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
   1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in modified dry-set mortar (thinset).
   2. Do not extend cleavage membrane, waterproof membrane, or crack isolation membrane under thresholds set in dry-set mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane, waterproof membrane, or crack isolation membrane with elastomeric sealant.

K. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

L. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 INSTALLATION OF TILE BACKING PANELS

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.5 INSTALLATION OF WATERPROOF MEMBRANES

A. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.6 INSTALLATION OF CRACK ISOLATION MEMBRANES

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.7 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove grout residue from tile as soon as possible.
   2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.8 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.9 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations
   1. Ceramic Floor Tile (CFT) and Quarry Floor Tile (QFT): Fortified Polymer-Portland Cement Mortar with Waterproof Membrane over Concrete Substrate.
      a. Designation: TCNA F121.
      b. Waterproofing: Sheet Waterproof Membrane.
      c. Bond Coat: Latex-Portland Cement Mortar.
      d. Mortar Bed: Fortified Polymer-Portland Cement Mortar.
      e. Grout: Water-Cleanable Epoxy Grout.
      f. Interior Wall and Base Installations
   2. Ceramic Tile Base (CTB) and Ceramic Wall Tile (CWT): Portland Cement Mortar over Cementitious Backer Board Substrate.
      a. Designation: TCA W244C.
      b. Cementitious Backer Unit: Cement Backer Board
      c. Waterproofing: Sheet Waterproof Membrane.
      d. Bond Coat: Portland Cement Mortar.
      e. Grout: Water-Cleanable Epoxy Grout.

END OF SECTION 093013

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

C. Samples for Initial Selection: For components with factory-applied finishes.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
   1. Acoustical Panels: Set of 6-inch square samples of each type, color, pattern, and texture.
   2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch long samples of each type, finish, and color.
   3. Clips: Full-size hold-down clips.

1.5 INFORMATIONAL SUBMITTALS

A. 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:
   1. Ceiling suspension-system members.
   2. Structural members to which suspension systems will be attached.
   3. Method of attaching hangers to building structure.

a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:
   a. Lighting fixtures.
   b. Diffusers.
   c. Grilles.
   d. Speakers.
   e. Access panels.
   f. Perimeter moldings.
7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.

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

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

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

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
   2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
   3. Hold-Down Clips: Equal to 2 percent of quantity installed.

1.8 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.
   1. Build mockup of typical ceiling area as shown on Drawings.

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

1.9 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.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 PRODUCTS

2.1 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. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

B. Classification: Provide fire-resistance-rated panels as follows:

C. Basis-of-Design Product: Subject to compliance with requirements, provide products by USG Interiors, Inc., or comparable product by one of the following:
   1. Armstrong World Industries, Inc
   2. CertainTeed Corp.
   3. Chicago Metallic Corporation.

D. Ceiling Type A (Modular Size Varies):
   1. Typical for Classrooms, Offices, Prep Rooms, and Storage Rooms.
      a. Style: Mars Acoustical Panels.
      b. Color: White.
      c. LR: Not less than 0.90.
      d. NRC: Not less than 0.75.
      e. CAC: Not less than 35.
      f. Edge/Joint Detail: Tapered edge, Shadowline Tapered (SLT)
      g. Thickness: 3/4 inch.
      h. Modular Size:
         1) 24 by 24 inches (Item 86785) or 24 by 48 inches (Item 88785), as indicated on drawings.
      i. Additional Requirements:
         1) Warranty against visible sag, mold, and mildew.

E. Ceiling Type B (Modular Size Varies):
   1. Typical for Kitchens, Pools, Locker Rooms, and Toilet Rooms.
      a. Style: Mars Healthcare Clean Room Acoustical Panels
      b. Color: White.
      c. LR: Not less than 0.90.
      d. NRC: Not less than 0.75.
      e. CAC: Not less than 35.
      f. Edge/Joint Detail: Tapered edge, Shadowline Tapered (SLT)
      g. Thickness: 3/4 inch.
      h. Modular Size:
         1) 24 by 24 inches (Item 86684CR) or 24 by 48 inches (Item 88683CR), as indicated on drawings.
      i. Additional Requirements:
         1) Warranty against visible sag, mold, and mildew.
         2) Washable and soil-resistant finish.

3) Impact and scratch resistant.
4) Integral/applied water-repellent membrane.

2.4 METAL SUSPENSION SYSTEM

A. 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.

B. Basis-of-Design Product: Subject to compliance with requirements, provide 15/16" DX Exposed Acoustical Suspension System by USG Interiors, Inc., or comparable product by one of the following:
1. Armstrong World Industries, Inc.
2. CertainTeed Corp.
3. Chicago Metallic Corporation.

C. Wide-Face, Capped, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch wide metal caps on flanges.
1. Structural Classification: Intermediate
2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
3. Face Design: Flat, flush.
4. Cap Material: Cold-rolled steel.
5. Cap Finish: As selected by Architect from manufacturer's full range of standard colors.

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.

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. Stainless-Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
3. Nickel-Copper-Alloy Wire: ASTM B164, nickel-copper-alloy UNS No. N04400.
4. 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 diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Hold-Down Clips: Manufacturer's standard hold-down.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Basis-of-Design Product: Subject to compliance with requirements, provide products by USG Interiors, Inc., or comparable product by one of the following:
   1. Armstrong World Industries, Inc.
   2. CertainTeed Corp.
   3. Chicago Metallic 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.

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 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, counter-splaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
   6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
   7. 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.
   8. Do not attach hangers to steel deck tabs.
   9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
   10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
   11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
   1. 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 o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
   3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
   1. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
   2. 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.
   3. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
      a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
   4. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
   1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

B. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.6 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 095113

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Resilient base.
   2. Resilient molding accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

C. Samples for Initial Selection: For each type of product indicated.

D. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

E. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 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.
   1. Coordinate mockups in this Section with mockups specified in other Sections.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. 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 resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 RESILIENT BASE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Armstrong World Industries, Inc.
2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
3. Johnsonite; A Tarkett Company.
4. Roppe Corporation, USA.
5. Or Approved Equal

B. Product Standard: ASTM F1861, Type TP (rubber, thermoplastic).
1. Group: I (solid, homogeneous)
2. Style and Location:

a. Style A, Straight: Provide in areas with carpet.
b. Style B, Cove: Provide in areas with resilient floor coverings.

C. Thickness: 0.125 inch

D. Height: 4 inches.

E. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.

F. Outside Corners: Pre-formed.

G. Inside Corners: Pre-formed.

H. Colors: As selected by Architect from full range of industry colors.

2.2 RESILIENT MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Armstrong World Industries, Inc.
2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
3. Johnsonite; A Tarkett Company.
4. Roppe Corporation, USA.

B. Description: Rubber reducer strips and transition strips for resilient floor coverings.

C. Locations: Provide rubber molding accessories in areas indicated.

D. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Accessories: Prepare horizontal surfaces according to ASTM F710.
1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install 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.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from surfaces.
   2. Sweep and vacuum horizontal surfaces thoroughly.
   3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

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SECTION 096519 - RESILIENT TILE FLOORING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Vinyl composition tile (VCT) flooring
   2. Luxury vinyl tile (LVT) flooring

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of resilient floor tile.
   1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
   2. Show details of special patterns.

C. Samples: Full-size units of each color, texture, and pattern of floor tile required.

D. Samples for Initial Selection: For each type of floor tile indicated.

E. Samples for Verification: Full-size units of each color and pattern of floor tile required.

F. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
   1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Coordinate mockups in this Section with mockups specified in other Sections.
      a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Architect.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL COMPOSITION TILE (VCT) FLOORING

A. Basis of Design: Provide products by the manufacturers indicated on the drawings. Subject to compliance with requirements, and subject to color and other aesthetic approval at the sole discretion of the Architect, other available manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
   1. Armstrong Commercial Flooring
   2. Congoleum Corp.
   3. Johnsonite
   4. Tarkett USA, Inc.
   5. Or Approved Equal
      a. Style: As indicated in the drawings.
      b. Module Size: As indicated on the drawings.
      c. Thickness: Per style indicated on the drawings.
      d. Flooring Color and Pattern: As selected by Architect from manufacturer's full range.

2.3 LUXURY VINYL TILE (LVT) FLOORING

A. Basis of Design: Provide products by the manufacturers indicated on the drawings. Subject to compliance with requirements, and subject to color and other aesthetic approval at the sole discretion of the Architect, other available manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
   1. Armstrong Commercial Flooring
   2. Congoleum Corp.
   3. Interface, Inc.
   4. Johnsonite
   5. Mannington Commerical
   6. Shaw International

7. Tarkett USA, Inc.
8. Or Approved Equal
    a. Style: As indicated in the drawings.
    b. Module Size: As indicated on the drawings.
    c. Thickness: Per style indicated on the drawings.
    d. Flooring Color and Pattern: As selected by Architect from manufacturer's full range.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated. Floor substrates shall be verified. If uneven floor substrates are encountered, leveling materials shall be provided to ensure new floor finishes do not require transitions between similar materials.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

C. Seamless-Installation Accessories:
    1. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

D. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
    1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
1. Lay tiles square with room axis in pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
1. Lay tiles with grain running in one direction.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Seamless Installation:
   1. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:
   1. Remove adhesive and other blemishes from surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

E. Joint Sealant: Apply sealant to floor tile perimeter and around columns, at door frames, and at other joints and penetrations.

F. Sealers and Finish Coats: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying liquid cleaners, sealers, and finish products.

1. Sealer: Apply two base coats of liquid sealer.
2. Finish: Apply two coats of liquid floor finish.

G. Cover floor tile until Substantial Completion.

END OF SECTION 096519

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SECTION 096700 - FLUID-APPLIED FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fluid-applied flooring and base.

1.2 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealing joints between fluid-applied flooring and adjacent construction and fixtures.

1.3 REFERENCE STANDARDS

A. ANSI/ESD STM7.1 - The Protection of Electrostatic Discharge Susceptible Items Flooring Systems Resistive Characterization; 2021.

B. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.

C. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2022.

D. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2015.

E. ASTM D905 - Standard Test Method for Strength Properties of Adhesive Bonds in Shear by Compression Loading; 2008 (Reapproved 2021).

F. ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser; 2019.

G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).

H. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.

I. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.

J. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

K. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

L. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, and patterns and colors available

C. Samples: Submit samples illustrating color and pattern for each floor material for each color specified.

D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.

E. Manufacturer's Qualification Statement.

F. Applicator's Qualification Statement.

G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section.
1. Minimum 5 years of documented experience.
2. Approved by manufacturer.

C. Supervisor Qualifications: Trained by product manufacturer , under direct full time supervision of manufacturer's own foreman.

1.6 MOCK-UPS

A. See Section 014000 - Quality Requirements for additional requirements.

B. Construct mock-up(s) of fluid applied flooring to serve as basis for evaluation of texture and workmanship.
1. Number of Mock-Ups to be Prepared: One.
2. Use same materials and methods for use in the work.
3. Use approved design samples as basis for mock-ups.
4. Locate where directed.
5. Minimum Size: 48 inches by 48 inches.

C. Obtain approval of mock-up by Architect before proceeding with work.

D. Approved mock-up may remain as part of the work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store resin materials in a dry, secure area.

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.8 FIELD CONDITIONS

A. Maintain minimum temperature in storage area of 55 degrees F.

B. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Fluid-Applied Flooring: Provide Stonegard MD fluid-applied, decorative quartz, seamless, slip-resistant broadcast flooring system manufactured by the Stonhard Group Global or a comparable product by:
1. Duraamen Engineered Products: www.duraamen.com/#sle.
2. Dur-A-Flex, Inc.: www.dur-a-flex.com/#sle.
3. Elite Crete Systems: www.elitecrete.com/#sle.
4. LATICRETE International, Inc: www.laticrete.com/#sle.
5. Palma, Inc. a Palma, Manton, Palma Company: www.palmainc.com/#sle
6. Sherwin-Williams High-Performance Flooring: www.sherwin-williams.com/resin-flooring/#sle.
7. Resinwerks: www.resinwerks.com/#sle.
8. Sika Corporation: www.sikafloorusa.com/#sle.
9. TNEMEC; Metallic Pigmented High-Wear System: www.tnemec.com/#sle.
10. Substitutions: See Section 016000 - Product Requirements.

2.2 FLUID-APPLIED FLOORING SYSTEM

A. Fluid-Applied Flooring:
1. Primer: Two-component, free-flowing, high-solids, urethane, elastomeric waterproofing membrane.
2. Undercoat: Three-component, free-flowing, epoxy formulation consisting of resin, curing agent, and fine aggregate.
3. Aggregate: Brightly colored, quartz broadcast aggregate.

4. Sealer: Two-component, high performance, UV resistant, clear epoxy, to provide medium texture.
5. System Thickness: 1/8 inch, nominal.
6. Texture: Slip resistant.
7. Color: As selected by Architect from full range of manufacturers color.
8. Cove: 4 inch high, integral cove.
    a. Install according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, of cove base. Round internal and external corners.

2.3 ACCESSORIES

A. Fillet Strips: Molded of flooring resin material.

B. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.

C. Primer: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.

D. Verify that wood subfloors have 12 percent maximum moisture content.

E. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
    1. Test as Follows:
        a. Alkalinity (pH): ASTM F710.
        b. Internal Relative Humidity: ASTM F2170.
        c. Moisture Vapor Emission: ASTM F1869.
    2. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.

F. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Where existing tile is scheduled to remain, fill grout lines between tiles with subfloor filler as required to provide smooth and even surface to accept new top coats.

C. Prepare concrete surfaces according to ICRI 310.2R.

D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.

E. Vacuum clean substrate.

F. Apply primer to surfaces required by flooring manufacturer.

3.3 INSTALLATION - FLOORING

A. Fill low spots, cracks, joints, holes, defects, grout joints, and other irregularities in substrates as required.
   1. Installation of fluid-applied flooring over existing ceramic tile is anticipated. In an effort to minimize irregularities from telegraphing thtough the finished fluid-applied flooring system, the Contractor shall prepare substrates as required ensure any/all low spots, cracks, joints, holes, defects, grout joints, and other irregularities are filled as required by the manufacturer.

B. Apply in accordance with manufacturer's instructions.

C. Apply each coat to minimum thickness required by manufacturer.

D. Finish to smooth level surface.

E. Cove at vertical surfaces where indicated on drawings.

F. The Owner and/or the Architect reserve the right to reject the fluid-applied flooring system in part or in its entirety if the installation of the system does not follow all of the requirements noted above.
   1. If installations fail to meet these requirements, the Owner and/or the Architect shall direct the Contractor to remedy or repair the fluid-applied flooring system to meet these requirements at no additional cost to the Owner.

3.4 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. Barricade area to protect flooring until fully cured.

END OF SECTION 096700

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SECTION 099100 - PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Primers.
   2. Finish coatings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include preparation requirements and application instructions.
   2. Indicate VOC content.

B. Samples: For each type of topcoat product.

C. Samples for Initial Selection: For each type of topcoat product.

D. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Apply coats on Samples in steps to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

E. Product Schedule: Use same designations indicated on Drawings and in the Exterior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
      a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
      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.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.8 PRODUCTS

1.9 PART 10 MANUFACTURERS

A. Source Limitations: Obtain each paint product from single source from single manufacturer.

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include but are not limited to products listed in the Exterior and Interior Painting Schedule for the paint category indicated.

C. Basis of Design: Provide products by the manufacturers indicated on the drawings Subject to compliance with requirements, and subject to color and other aesthetic approval at the sole discretion of the Architect, other available manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
   1. Behr Paint Company,
   2. Benjamin Moore & Co.
   3. PPG Industries, Inc.
   4. The Sherwin-Williams Company
   5. Tnemec Company, Inc.

1.10 PAINT PRODUCTS, 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 topcoat manufacturer for use in paint system and on substrate indicated.

B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for exterior and interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base:
   1. Flat Paints and Coatings: 50 g/L.
   2. Nonflat Paints and Coatings: 150 g/L.
   3. Dry-Fog Coatings: 400 g/L.
   4. Primers, Sealers, and Undercoaters: 200 g/L.
   5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
   6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
   7. Pretreatment Wash Primers: 420 g/L.
   8. Floor Coatings: 100 g/L.
   9. Shellacs, Clear: 730 g/L.
   10. Shellacs, Pigmented: 550 g/L.

C. Colors: As selected by Architect from manufacturer's full range.

PART 2 EXECUTION

2.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. Fiber-Cement Board: 12 percent.
   3. Masonry (Clay and Concrete Masonry Units): 12 percent.
   4. Wood: 15 percent.
   5. Portland Cement Plaster: 12 percent.
   6. Gypsum Board: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

D. Exterior Gypsum Board Substrates: Verify that finishing compound is dry and sanded smooth.

E. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.
   1. Application of coating indicates acceptance of surfaces and conditions.

2.2 PREPARATION

A. Comply with manufacturer's written instructions 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 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 specified in this Section.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.
   1. SSPC-SP 2.
   2. SSPC-SP 3.
   3. SSPC-SP 7/NACE No. 4.
   4. SSPC-SP 11.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. 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 remove sanding dust.
   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.

K. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

2.3 INSTALLATION

A. Apply paints in accordance with manufacturer's written instructions.
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
   3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
   4. Paint entire exposed surface of window frames and sashes.
   5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   6. Primers specified in the Exterior Painting Schedule may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. 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.

D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following work where exposed to view:
      a. Uninsulated piping, if installed against painted substrates.
      b. Conduit, if installed against painted substrates.

2.4 FIELD QUALITY CONTROL

A. 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 instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

2.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
   1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
   2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
   3. Allow empty paint cans to dry before disposal.
   4. Collect waste paint by type and deliver to recycling or collection facility.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

2.6 EXTERIOR PAINTING SCHEDULE

A. Concrete Nontraffic Surfaces:
1. Latex System:
a. Prime Coat: Primer sealer, latex.
1) S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils wet, 3.2 mils dry.
b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior, satin.
1) S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

B. CMU Substrates:
1. Latex System:
a. Block Filler: Block filler, latex, interior/exterior:
1) S-W PrepRite Block Filler, B25W25, at 75 to 125 sq. ft. per gal.
b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior, satin.
1) S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

C. Ferrous Metal, Galvanized-Metal, and Aluminum Substrates:
1. Water-Based Light Industrial Coating System:
a. Prime Coat: Primer, water based.
1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, 5.0 to 10.0 mils wet, 2.0 to 4.0 mils dry.
b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
c. Topcoat: Light industrial coating, exterior, water based, semi-gloss.
1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.

D. Wood Substrates: Exposed wood items not indicated to receive shop-applied finish.
1. Latex System:
a. Prime Coat: Primer, latex for exterior wood.
1) S-W Exterior Latex Primer, B42, at 4.0 mils wet, 1.4 mils dry, per coat.
b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior, satin:
1) S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

E. Plastic Trim Fabrication Substrates: Including PVC, plastic, and fiberglass items.
1. Latex System:
a. Prime Coat: Primer, bonding, water-based:

1) S-W PrepRite ProBlock Latex Primer/Sealer, B57-620 Series, at 4.0 mils wet, 1.4 mils dry.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, satin:

1) S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

F. Exterior Gypsum Board Substrates:

1. Latex System:

a. Prime Coat: Primer bonding, water-based.

1) S-W PrepRite ProBlock Latex Primer/Sealer, B57-620 Series, at 4.0 mils wet, 1.4 mils dry.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss.

1) S-W Solo Acrylic Semi-Gloss, A76 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

2.7 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex System:

a. Prime Coat: Primer, latex, interior.

1) S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils wet, 3.2 mils dry.

b. Intermediate Coat: Latex, interior, matching topcoat.

c. Topcoat: Latex, interior, eggshell.

1) S-W ProMar 200 Zero VOC Latex Egg-Shell, B20-2600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.

B. CMU Substrates:

1. Latex System:

a. Block Filler: Block filler, latex, interior/exterior:

1) S-W PrepRite Block Filler, B25W25, at 75-125 sq. ft. per gal.

b. Intermediate Coat: Latex, interior, matching topcoat.

c. Topcoat: Latex, interior, eggshell:

1) S-W ProMar 200 Zero VOC Latex Egg-Shell, B20-2600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.

C. Metal Substrates (Aluminum, Steel, Galvanized Steel):

1. Latex System:

a. Prime Coat: Primer, rust-inhibitive, water based:

1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.

b. Intermediate Coat: Water-based acrylic, interior, matching topcoat.

c. Topcoat: Water-based acrylic, gloss:
1) S-W Pro Industrial Acrylic Gloss Coating, B66-660 Series, at 2.5 to 4.0 mils dry, per coat.

D. Wood Substrates: Exposed wood items not indicated to receive shop-applied finish.
1. Latex System:
a. Prime Coat: Primer sealer, latex, interior:
1) S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils wet, 1.4 mils dry.
b. Intermediate Coat: Latex, interior, matching topcoat.
c. Topcoat: Latex, interior, eggshell:
1) S-W ProMar 200 Zero VOC Latex Egg-Shell, B20-2600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.

E. Gypsum Board Substrates:
1. Latex System:
a. Prime Coat: Primer, latex, interior:
1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.0 mils dry.
b. Intermediate Coat: Latex, interior, matching topcoat.
c. Topcoat: Latex, interior, eggshell:
1) S-W ProMar 200 Zero VOC Latex Egg-Shell, B20-2600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.

END OF SECTION 099100

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SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. High performance coatings.

B. Surface preparation.

1.2 RELATED REQUIREMENTS

A. Section 099113 - Exterior Painting: For typical exterior painting requirements not specifically indicated on the drawings as a high performance coating.

1.3 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2023.

C. ASTM D4259 - Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application; 2018.

D. ASTM D4260 - Standard Practice for Liquid and Gelled Acid Etching of Concrete; 2023.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

F. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2020.

G. FS TT-P-28 - Coating, Heat Resisting; 2021.

H. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

I. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

J. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).

L. SSPC V1 (PM1) - Good Painting Practice: Painting Manual Volume 1; 2024.

M. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual Volume 2; 2021.

N. SSPC-Paint 16 - Coal-Tar Epoxy Polyamide (Black or Dark Red) Coating; 2023.

O. SSPC-PA 1 - Shop, Field, and Maintenance Coating of Metals; 2024.

P. SSPC-PA 2 - Procedure for Determining Conformance to Dry Coating Thickness Requirements; 2022.

Q. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

R. SSPC-SP 2 - Hand Tool Cleaning; 2024.

S. SSPC-SP 3 - Power Tool Cleaning; 2024.

T. SSPC-SP 5/NACE No.1 - White Metal Blast Cleaning; 2006.

U. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

V. SSPC-SP 7/NACE No.4 - Brush-Off Blast Cleaning; 2006.

W. SSPC-SP 10/NACE No.2 - Near-White Metal Wet Abrasive Blast Cleaning; 2006.

X. SSPC-SP 11 - Power-Tool Cleaning to Bare Metal; 2020.

Y. SSPC-SP 13/NACE No.6 - Surface Preparation of Concrete; 2018.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.

C. Samples: Submit samples 8 by 8 inch in size illustrating colors available for selection.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

F. Maintenance Data: Include cleaning procedures and repair and patching techniques.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Coating Materials: 1 gallon of each type and color.
   3. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.5 QUALITY ASSURANCE

A. Maintain one copy of each referenced document that applies to application on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

C. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

A. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.

C. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.

D. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

F. Restrict traffic from area where coating is being applied or is curing.

1.8 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for bond to substrate.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Only materials (primers, coatings, etc.) listed in the latest edition of the MPI Approved Product List (APL) are acceptable for use on this project.

B. Provide high performance coating products from the same manufacturer to the greatest extent possible.
1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
2. Substitution of other products by the same manufacturer is preferred over substitution of products by a different manufacturer.
3. Substitution of a different high performance coating system using MPI-approved products by the same manufacturer will be considered.

C. High-Performance Coatings:
1. APV Engineered Coatings: www.apvcoatings.com/#sle.
2. Dow: www.dow.com/#sle.
3. Pittsburgh Paints: www.ppgpaints.com/#sle.
4. Precision Coatings: www.precisioncoatingsinc.com/#sle.
5. Rhino Linings Corporation: www.rhinolinings.com/#sle.
6. Sika Corporation: www.sika.com/#sle.
7. Sherwin-Williams Company: www.protective.sherwin-williams.com/industries/#sle.
8. Tnemec Company, Inc: www.tnemec.com/#sle.
9. Substitutions: Section 016000 - Product Requirements.

2.2 HIGH-PERFORMANCE COATINGS

A. MPI Standards: Provide products that comply with MPI standards indicated and are listed in MPI Approved Products List.

B. Provide coating systems that meet the following minimum performance criteria, unless more stringent criteria are specified:

2.3 COATING MATERIALS

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.
   1. For Exterior Metal Rehabilitation Applications (as indicated on drawings):
      a. Basis of Design: Provide Series Series 115 Uni-Bond DF Self-crosslinking Hydrophobic Acrylic coating manufactured by Tnemec Company, Inc. with the manufacturer's recommended primer to provide coating system which is waterborne, rust-inhibitor with excellent adhesion to zinc-rich coatings, or an approved product by one of the following:
         1) APV Engineered Coatings: www.apvcoatings.com/#sle.
         2) Dow: www.dow.com/#sle.
         3) Pittsburgh Paints: www.ppgpaints.com/#sle.
         4) Precision Coatings: www.precisioncoatingsinc.com/#sle.
         5) Rhino Linings Corporation: www.rhinolinings.com/#sle.
         6) Sika Corporation: www.sika.com/#sle.
         7) Sherwin-Williams Company: www.protective.sherwin-williams.com/industries/#sle.
         8) Sumter Coatings, Inc.: www.sumtercoatings.com/#sle.
   2. For Exterior Wood Rehabilitation Applications (as indicated on drawings):
      a. Basis of Design: Provide Series 73 Endura-Shield two-part Aliphatic Acrylic Polyurethane coating manufactured by Tnemec Company, Inc. with the manufacturer's recommended primer to provide coating system which is highly resistant to abrasion, wet conditions, corrosive fumes, chemical contact and has excellent resistance to exterior weathering, or an approved product by one of the following:
         1) APV Engineered Coatings: www.apvcoatings.com/#sle.
         2) Dow: www.dow.com/#sle.Pittsburgh Paints: www.ppgpaints.com/#sle.Precision Coatings: www.precisioncoatingsinc.com/#sle.Rhino Linings Corporation: www.rhinolinings.com/#sle.Sika Corporation: www.sika.com/#sle.Sherwin-Williams Company: www.protective.sherwin-williams.com/industries/#sle.Sumter Coatings, Inc.: www.sumtercoatings.com/#sle.
         3) Pittsburgh Paints: www.ppgpaints.com/#sle.
         4) Precision Coatings: www.precisioncoatingsinc.com/#sle.
         5) Rhino Linings Corporation: www.rhinolinings.com/#sle.
         6) Sika Corporation: www.sika.com/#sle.

7) Sherwin-Williams Company: www.protective.sherwin-williams.com/industries/#sle.
8) Sumter Coatings, Inc.: www.sumtercoatings.com/#sle.

B. Shellac: Pure, white type.

2.4 PRIMERS

A. Primers: Provide primers as required or recommended by coating manufacturer for specified coating system.

2.5 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

F. Test shop-applied primer for compatibility with subsequent cover materials.

G. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Plaster and Stucco: 12 percent.
2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
3. Concrete Floors and Traffic Surfaces: 8 percent.
4. Wood: Do not begin application if substrate has moisture content over 12 percent.

H. Masonry: Verify masonry joints are struck flush.

I. Proceed with coating application only after unacceptable conditions have been corrected.
   1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

B. Clean surfaces of loose foreign matter.

C. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.

D. Remove finish hardware, fixture covers, and accessories and store.

E. Existing Painted and Sealed Surfaces:
   1. Strip existing paint and coatings from surface.
   2. Clean with mixture of trisodium phosphate and water to remove surface grease and foreign matter.

F. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Clean surfaces with pressurized water. Use pressure range of 1,500 to 4,000 psi at 6 to 12 inches. Allow to dry.
   3. Clean concrete according to ASTM D4258. Allow to dry.
   4. Prepare surface as recommended by coating manufacturer and in accordance with SSPC-SP 13/NACE No.6.

G. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by coating manufacturer.
   3. Clean surfaces with pressurized water. Use pressure range of 600 to 1,500 psi at 6 to 12 inches. Allow to dry.

H. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

I. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

2. Prepare surface according to SSPC-SP 2.

J. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3, and protect from corrosion until coated.

3.3 PRIMING

A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

B. Wood: Prior to priming patch with filler to produce smooth, even surface.

C. Concrete: Prior to priming, patch with masonry filler to produce smooth surface.

D. Concrete Masonry: Apply masonry filler to thickness required to fill holes and produce smooth surface; minimum thickness of 30 mils.

E. Wood Items to Receive High-Performance Coating: Wipe off dust and grit, sealing, seal knots, pitch streaks, and sappy sections as directed by coating manufacturer. Fill nail holes and cracks with matching tinted filler.

3.4 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in MPI - Architectural Painting and Specification Manual.

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.5 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.6 PROTECTION

A. Protect finished work from damage until the completion of construction activities.

END OF SECTION 099600

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SECTION 101100 - VISUAL DISPLAY UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Chalkboards.

B. Porcelain enamel steel markerboards.

C. Tackboards.

1.2 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Blocking and supports.

B. Section 092216 - Non-Structural Metal Framing: Concealed supports in metal stud walls.

1.3 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).

C. ANSI A208.1 - American National Standard for Particleboard; 2022.

D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

E. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.

F. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2022.

G. ASTM C1036 - Standard Specification for Flat Glass; 2021.

H. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

I. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.

J. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

L. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2020.

M. PS 1 - Structural Plywood; 2019.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's data on chalkboard, porcelain enamel steel markerboard, tackboard, and trim.

B. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.

C. Test Reports: Show compliance to specified surface burning characteristics requirements.

D. Manufacturer's Qualification Statement.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.1 VISUAL DISPLAY UNITS

A. Chalkboards: Chalkboard enamel on hardboard.
1. Color: As selected from manufacturer's full range.
2. Hardboard Face Sheet Thickness: 1/4 inch.
3. Core: Hardboard, manufacturer's standard thickness, laminated to face sheet.
4. Backing: Aluminum sheet, laminated to core.
5. Size: As indicated on drawings.
6. Frame: Extruded aluminum , with concealed fasteners.
7. Frame Finish: Anodized, natural.
8. Accessories: Provide chalk tray.

B. Porcelain Enamel Steel Markerboards:
1. Color: White.

2. Steel Face Sheet Thickness: 24 gauge, 0.0239 inch .
3. Core: Hardboard, manufacturer's standard thickness, laminated to face sheet.
4. Backing: Aluminum sheet, laminated to core.
5. Size: As indicated on drawings.
6. Frame: Extruded aluminum , with concealed fasteners.
7. Frame Profile: Square.
8. Frame Finish: Anodized, natural.
9. Accessories: Provide marker tray.

C. Tackboards: Fabric laminated to cork.
1. Cork Thickness: 1/8 inch.
2. Fabric: Vinyl-coated fabric.
3. Color: As selected from manufacturer's full range.
4. Backing: Hardboard, 1/4 inch thick, laminated to tack surface.
5. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
6. Size: As indicated on drawings.
7. Frame: Extruded aluminum , with concealed fasteners.
8. Frame Profile: Manufacturer's standard.
9. Frame Finish: Anodized, natural.

2.2 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.

B. Hardboard for Chalk Surface: ANSI A135.4 Tempered type.

C. Vinyl-Coated Fabric: ASTM F793 Category VI.

D. Plywood: PS 1 Grade C-D , softwood.

E. Hardboard for Cores: ANSI A135.4, Class 1 - Tempered, S2S (smooth two sides).

F. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.

G. Aluminum Sheet Backing: 27 gauge, 0.014 inch thick.

H. Steel Sheet Backing: 28 gauge, 0.0149 inch, galvanized.

I. Adhesives: Type used by manufacturer.

2.3 ACCESSORIES

A. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

B. Marker Tray: Aluminum, manufacturer's standard profile, one piece full length of markerboard, molded ends, concealed fasteners, same finish as frame.

C. Chalk Tray: Aluminum, manufacturer's standard profile, one piece full length of chalkboard, molded ends, concealed fasteners, same finish as frame.

D. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated on shop drawings.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

C. Verify flat wall surface for frameless adhesive-applied boards.

3.2 PREPARATION

A. Acclimatize tackable wall panels by removing from packaging in installation area not less than 24 hours before application.

B. Remove switchplates, wall plates, and surface-mounted fixtures where tackable wall paneling is applied. Reinstall items on completion of installation.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install boards in accordance with manufacturer's instructions.

B. Install at elevations indicated in drawings.

C. Secure units level and plumb.

D. Butt Joints: Install with tight hairline joints.

3.4 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at Date of Substantial Completion.

D. Break-in slate chalkboards with a chalk and clean treatment.

END OF SECTION 101100

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SECTION 101423 - INTERIOR PANEL SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Panel signs.

B. Related Requirements:

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For panel signs.
   1. Include fabrication and installation details and attachments to other work.
   2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
   3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
   1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
   1. Panel Signs: Full-size Sample.
   2. Variable Component Materials: Full-size Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not included in Samples above.
   3. Exposed Accessories: Full-size Sample of each accessory type.
   4. Full-size Samples, if approved, will be returned to Contractor for use in Project.

E. Product Schedule: For panel signs. Use same designations indicated on Drawings or specified.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Tools: One set of specialty tools for assembling signs and replacing variable sign components.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer of products.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Deterioration of finishes beyond normal weathering.
      b. Deterioration of embedded graphic image.
      c. Separation or delamination of sheet materials and components.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PANEL SIGNS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Best Sign Systems, Inc. or a comparable product by one of the following:
   1. ACE Sign Systems, Inc.
   2. Advance Corporation; Braille-Tac Division.
   3. Allen Industries Architectural Signage.
   4. Allenite Signs; Allen Marking Products, Inc.
   5. APCO Graphics, Inc.
   6. ASI-Modulex, Inc.
   7. Bunting Graphics, Inc.
   8. Fossil Industries, Inc.
   9. Gemini Incorporated.
   10. Grimco, Inc.
   11. Innerface Sign Systems, Inc.
   12. InPro Corporation
   13. Matthews International Corporation; Bronze Division.
   14. Mills Manufacturing Company.
   15. Mohawk Sign Systems.
   16. Nelson-Harkins Industries.
   17. Seton Identification Products.
   18. Signature Signs, Incorporated.
   19. Supersine Company (The).

B. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, complying with the following requirements:
   1. Acrylic Sheet: 0.125 inch (3.175 mm) thick.
   2. PVC Sheet: 0.125 inch (3.175 mm) thick, extruded, high-impact PVC plastic.
   3. Laminated Sheet: High-pressure engraved stock with face laminated to acrylic core in finishes and color combinations indicated.
   4. Edge Condition: Beveled.
   5. Corner Condition: Rounded to 3/8 inch (9.52 mm).
   6. Mounting: Unframed.
      a. Ceiling Projection mounted with two-face tape.
      b. Manufacturer's standard anchors for substrates encountered.
   7. Custom Paint Colors: Match Pantone color matching system.
   8. Color: As selected by Architect from manufacturer's full range.
   9. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch (0.8 mm) above surface.

10. Lettering: Raised 1/32 inch (0.80 mm) integral with panel material. White melamine surface.
    a. Font Type: To Be Selected by Architect from Standard Fonts
    b. Size: As indicated.
11. Sizes and Types: Refer to signage information on drawings.
12. Text and Quantities of Signs: Refer to signage information on drawings.
13. Flame Spread Classification: Class A Finish – flame spread 0-25; any material classified at 25 or less, and any element thereof which, when so tested, shall not continue to propagate fire.

C. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of transparent covers with paper inserts printed by Owner.
1. Furnish insert material and software for creating text and symbols for PC-Windows computers for Owner production of paper inserts.
2. Furnish insert material cut-to-size for changeable message insert.

D. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are UV and water resistant for five years for application intended.

2.2 PANEL-SIGN MATERIALS

A. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

B. Fiberglass Sheet: Multiple laminations of glass-fiber-reinforced polyester resin with UV-light stable, colorfast, nonfading, weather- and stain-resistant, colored polyester gel coat, and with manufacturer's standard finish.

C. Polycarbonate Sheet: ASTM C1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate), with coating on both sides.

D. PVC Sheet: Manufacturer's standard, UV-light stable, PVC plastic.

E. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated on Drawings and suitable for exterior applications.

F. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following unless otherwise indicated:
   1. Use concealed fasteners and anchors unless indicated to be exposed.
   2. For exterior exposure, furnish hot-dip galvanized devices unless otherwise indicated.
   3. Exposed Metal-Fastener Components, General:
      a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
      b. Fastener Heads: For nonstructural connections, use flathead screws and bolts with tamper-resistant slots unless otherwise indicated.
   4. Sign Mounting Fasteners:
      a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material or screwed into back of sign assembly unless otherwise indicated.
      b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material or screwed into back of sign assembly, unless otherwise indicated.
      c. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, and installed in predrilled holes.

B. Adhesive: As recommended by sign manufacturer.

C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch, with adhesive on both sides.

D. Hook-and-Loop Tape: Manufacturer's standard two-part tape consisting of hooked part on sign back and looped side on mounting surface.

E. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.

2.4 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
   1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
   2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
   3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.

4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Internally brace signs for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into indicated sign surface to produce precisely formed copy, incised to uniform depth.
1. Engraved Metal: Fill engraved graphics with manufacturer's standard baked enamel.
2. Engraved Opaque Acrylic Sheet: Fill engraved graphics with manufacturer's standard enamel.
3. Face-Engraved Clear Acrylic Sheet: Fill engraved copy with manufacturer's standard enamel. Apply manufacturer's standard opaque background color coating to back face of acrylic sheet.
4. Engraved Plastic Laminate: Engrave through exposed face ply of plastic-laminate sheet to expose contrasting core ply.

C. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

D. Subsurface-Engraved Graphics: Reverse engrave back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.

E. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.

F. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:
1. For snap-in changeable inserts beneath removable face sheet, furnish one suction or other device to assist in removing face sheet. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner's use.
2. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner's use.
3. For frame to hold changeable sign panel, fabricate frame without burrs or constrictions that inhibit function. Furnish initial sign panel. Subsequent changeable sign panels are by Owner.

G. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

1. Stainless-Steel Brackets: Factory finish brackets to match sign background finish unless otherwise indicated.

2.5 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.6 ACRYLIC SHEET FINISHES

A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
   1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
   2. Install signs so they do not protrude or obstruct according to the accessibility standard.
   3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
   4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Accessible Signage: Install in locations on walls as indicated on Drawings and [according to the accessibility standard.

C. Mounting Methods:
   1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
      a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
   2. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
      a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
      b. Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.
   3. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
   4. Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position so that signage is correctly located and aligned.
   5. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

6. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position and push to engage tape adhesive.
7. Hook-and-Loop Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply sign component of two-part tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage; push to engage tape adhesive. Keep tape strips 0.250 inch from edges to prevent visibility at sign edges when sign is initially installed or reinstalled. Apply substrate component of tape to substrate in locations aligning with tape on back of sign; push and rub well to fully engage tape adhesive to substrate.
8. Magnetic Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position.
9. Shim-Plate Mounting: Provide 1/8-inch thick, concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other direct mounting methods are impractical. Attach plate with fasteners and anchors suitable for secure attachment to substrate.

D. Field-Applied, Vinyl-Character Signs: Clean and dry substrate. Align sign characters in final position before removing release liner. Remove release liner in stages and apply and firmly press characters into final position. Press from the middle outward to obtain good bond without blisters or fishmouths. Remove carrier film without disturbing applied vinyl film.

E. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423

SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Solid plastic toilet compartments.

1.2 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Blocking and supports.

B. Section 102800 - Toilet, Bath, and Laundry Accessories.

1.3 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

C. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.4 ADMINISTRATIVE REQUIREMENTS

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on panel construction, hardware, and accessories.

C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.

D. Samples: Submit samples of partition panels, illustrating panel finish, color, and sheen.

E. Manufacturer's Installation Instructions: Indicate special procedures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Solid Plastic Toilet Compartments:
   1. Provide Hiny Hider HDPE Partitions manufactured by Scranton Products, or a comparable product by:
      a. ASI Accurate Partitions: www.asi-accuratepartitions.com/#sle.
      b. ASI Global Partitions: www.asi-globalpartitions.com/#sle.
      c. Hadrian: www.hadrian-inc.com/#sle.
      d. Metpar Corp: www.metpar.com/#sle.
      e. Partition Systems International of South Carolina: www.psisc.com/#sle.
      f. Substitutions: See Section 016000 - Product Requirements.

2.2 PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted headrail-braced.
   1. Color: Single color as selected from manufacturer's full range of colors.
   2. Doors:
      a. Thickness: 1 inch.
      b. Width: As Indicated on drawings, 24 inches minimum.
      c. Width for Handicapped Use: Outswinging, as Indicated on drawings, 36 inches minimum.
      d. Height: 55 inch.
   3. Panels:
      a. Thickness: 1 inch.
      b. Height: 55 inch.
   4. Pilasters:
      a. Thickness: 1 inch.
      b. Width: As required to fit space; minimum 3 inch.

2.3 ACCESSORIES

A. Pilaster Shoes: Stainless steel, satin finish, 4 inches high; concealing floor fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

B. Head Rails: Extruded aluminum, anti-grip profile.
   1. Size: Manufacturer's standard size.

C. Wall and Pilaster Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.

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. Hinges: Stainless steel, manufacturer's standard finish.
   1. Continuous-type hinge, self closing.

F. Door Hardware: Stainless steel, manufacturer's standard finish.
   1. Door Latch: Slide type with exterior emergency access feature.
   2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
   3. Provide door pull for outswinging doors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify correct spacing of and between plumbing fixtures.

B. 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 inch to 1/2 inch 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.

B. Maximum Variation From Plumb: 1/8 inch.

3.4 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

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 102113.19

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Commercial toilet, shower, and bath accessories.

B. Commercial shower and bath accessories.

C. Electric hand/hair dryers.

D. Utility room accessories.

1.2 RELATED REQUIREMENTS

A. Section 093000 - Tiling: Ceramic washroom accessories.

B. Section 102113.19 - Plastic Toilet Compartments.

1.3 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2022).

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

D. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2022.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.

F. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

G. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2018, with Editorial Revision (2021).

H. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017 (Reapproved 2022).

I. ASTM C1036 - Standard Specification for Flat Glass; 2021.

J. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.

K. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.

L. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2021.

M. ASTM D4802 - Standard Specification for Poly(Methyl Methacrylate) Acrylic Plastic Sheet; 2016.

N. ASTM D5047 - Standard Specification for Polyethylene Terephthalate Film and Sheeting; 2017.

O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

P. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004, with Editorial Revision (2016).

Q. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

R. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

1.5 SUBMITTALS

A. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

B. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.1 COMMERCIAL TOILET ACCESSORIES

A. Owner Furnished Commercial Toilet, Shower, and Bath Accessories: Owner furnished accessories to be turned over to Contractor for installation as indicated on the drawings.

B. Contractor Provided (Furnished and Installed) Commercial Toilet, Shower, and Bath Accessories:

1. AJW Architectural Products: www.ajw.com/#sle.
2. American Specialties, Inc: www.americanspecialties.com/#sle.
3. Bradley Corporation: www.bradleycorp.com/#sle.
4. Bobrick Washroom Equipment, Inc.: www.bobrick.com/#sle.
5. Georgia-Pacific Professional: www.gppro.com/#sle.
6. Kimberly-Clark Corporation: www.kcprofessional.com/#sle..
7. Substitutions: See Section 016000 - Product Requirements.

C. Electric Hand/Hair Dryers (Contractor Provided): Surface-mounted, brushless motor, push-button operated hand dryer.
   1. Motor Operation: 3,200 RPM.
   2. Airflow: 107 CFM at 50 MPH minimum.
   3. Power: 120V, 15A, 1800W, 60 Hz.
   4. Color: Aluminum, Brushed Chrome
   5. Provide NOVA 5 surface mounted quiet hand dryers manufacturered by World Dryer, or a comparable product by:
      a. American Specialties, Inc: www.americanspecialties.com/#sle.
      b. Dyson Inc: www.dyson.com/#sle.
      c. Excel Dryer: www.exceldryer.com/#sle.
      d. Frost Products Limited: www.frostproductsltd.com/#sle.
      e. Stelpro Design Inc: www.stelpro.com/#sle.
      f. Substitutions: Section 016000 - Product Requirements.
      g. American Specialties, Inc: www.americanspecialties.com/#sle.
      h. Dyson Inc: www.dyson.com/#sle.
      i. Excel Dryer: www.exceldryer.com/#sle.
      j. Frost Products Limited: www.frostproductsltd.com/#sle.
      k. Stelpro Design Inc: www.stelpro.com/#sle.
      l. Substitutions: SeeSection 016000 - Product Requirements.

D. Toilet Paper Dispenser: Owner furnished, contractor supplied as indicated on drawings.

E. Paper Towel Dispenser: Owner furnished, contractor supplied as indicated on drawings.

F. Fixed Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass;ASTM C1036.
   1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
   2. Size: As indicated on drawings.
   3. Frame: 0.05 inchangle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
   4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.

G. Tilting Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass;ASTM C1036.

1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
2. Size: As indicated on drawings.
3. Frame: 0.05 inchangle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
4. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
5. Adjustable Tilt Mirrors: Stainless steel piano hinge full width of base and elbow hinges at sides of mirror, for minimum tilt forward from top of 6 inches.

H. Grab Bars: Stainless steel, smooth surface.
1. Heavy Duty Grab Bars: Floor supports are not acceptable.
a. Push/Pull Point Load: Minimum 1000 pound-force, minimum.
b. Dimensions: 1-1/2 inch outside diameter, minimum 0.125 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
c. Finish: Satin.
d. Length and Configuration: As indicated on drawings.

I. Combination Sanitary Napkin/Tampon Dispenser: Owner furnished, contractor supplied as indicated on drawings.

J. Sanitary Napkin Disposal Unit: Owner furnished, contractor supplied as indicated on drawings.

2.2 COMMERCIAL TOILET ACCESSORIES

A. Shower Curtain Rod: Stainless steel tube, 1 inch outside diameter, 0.05 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for concealed mounting.

B. Shower Curtain:
1. Material: Nylon reinforced vinyl, 0.008 inch thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
2. Size: 48 by 72 inches, hemmed edges.
3. Grommets: Stainless steel; pierced through top hem on 6 inch centers.
4. Color: As selected from manufacturer's standard colors.
5. Shower Curtain Hooks: Stainless steel spring wire designed for snap closure.

C. Folding Shower Seat: Foldable, wall-mounted; welded tubular seat frame, structural support members, swing-down legs, hinges, and mechanical fasteners of Type 304 stainless steel, L-shaped seat.
1. Seat: Phenolic or polymeric composite one-piece seat or seat slats.
2. Size: ADA Standards compliant.

D. Robe Hook: Heavy-duty stainless steel, double-prong, bracket and backplate for concealed attachment, satin finish.

2.3 COMMERCIAL UTILITY ACCESSORIES Accessories

A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
   1. Holders: Three spring-loaded rubber cam holders.
   2. Length: Manufacturer's standard length for number of holders.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.

D. Verify that field measurements are as instructed by the manufacturer.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
   1. Grab Bars: As indicated on drawings.
   2. Mirrors: As indicated on drawings.
   3. Electric Hand Dryers: As indicated on drawings.
   4. Other Accessories: As indicated on drawings.

3.4 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION 102800

SECTION 105126 - PLASTIC LOCKERS & BENCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal and reinstallation of solid plastic lockers

B. Installation of new ADA compliant shelves for ADA locker locations.

C. Removal of existing plastic benches and installation of new high-density polyethylene benches

1.2 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry

1.3 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

D. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's published data on bench construction, sizes and accessories.

C. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finishes and adjacent surfaces from damage during removal and reinstallation.

B. Protect bench finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Solid Plastic Lockers: Existing to be removed and reinstal

2.2 LOCKER APPLICATIONS

A. Athletic Lockers (Existing): Perforated plastic lockers with sloped top and padlock hasps, installed on concrete plinths with ceramic tile finish.
   1. Width: 12 inches
   2. Depth: 14 inches
   3. Height: 72 inches.
   4. Locker Configuration: Two tier.
   5. Where indicated on drawings with ADA designations, provide new ADA compliant shelves at the bottom tier of lockers. Shelves to fit within configuration of existing lockers.

B. Locker Benches: Stationary type; bench seat constructed of solid high density polyethylene (HDPE) with satin stainless steel pedestals.
   1. Seat Height: 16 inches above floor.
   2. Seat Length: As indicated on drawings.
   3. Seat Depth: 9 inches minimum.

C. ADA Locker Benches: Stationary type; bench seat and back constructed of solid high density polyethylene (HDPE) with satin stainless steel pedestals.
   1. Accessibility: Comply with ICC A117.1 and ADA Standards.
      a. Seat Height: 17 inches minimum, 19 inches maximum, above floor.
      b. Seat Length: As indicated on drawings, 42 inches minimum.
      c. Seat Depth: 20 inches minimum, 24 inches maximum.
      d. Back Height: 18 inches minimum.
      e. Back Length: Same length as seat.
      f. Gap Between Seat and Back: 2 inches maximum.
   2. Clear Floor Area: Minimum 48 inch by 30" clear floor area shall be maintained to one side of each ADA bench.

PART 3 EXECUTION

3.1 REMOVAL AND REINSTALLATION OF LOCKERS

A. Carefully remove all existing locker components, tops, bases, fillers, hasps, hardware, etc. and salvage for reinstallation after renovation work is complete.

B. Reinstall lockers in accordance with manufacturer's instructions.

C. Place and secure on existing base.

D. Reinstall lockers plumb and square.

E. Secure lockers with anchor devices to suit substrate materials.

F. Minimum Pullout Force: 100 pounds.

G. Reinstall end panels, filler panels, and sloped tops.

H. Reinstall fittings if not factory installed.

I. Replace components that do not operate smoothly.

3.2 INSTALLATION OF BENCHES

A. Install in accordance with manufacturer's instructions.

B. Install benches level and square.

C. Install componenets if not factory installed.

D. Replace components that do not operate smoothly.

3.3 CLEANING

A. Clean locker interiors and exterior surfaces after reinstallation. Protect lockers from construction activities occuring after their reinstallation.

B. Clean bench surfaces after installation. Protect lbenches from construction activities occuring after their reinstallation.

END OF SECTION 105126

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SECTION 105626 - MOBILE STORAGE SHELVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manual mobile storage shelving systems.

1.2 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

C. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2023.

D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. System components.
   2. Accessories.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.
   5. Specimen warranty.

C. Shop Drawings: Indicate location, type, and layout of mobile storage shelving system, including lengths, heights, and aisle layout, and relationship to adjacent construction.
   1. Indicate location and configuration of rails.
   2. Indicate method of installation and configuration for shelving mounted on carriages.
   3. Provide location and details of anchorage devices to be embedded in or fastened to the structure.

D. Selection Samples: For each finish product specified, provide color chips representing manufacturer's full range of available colors and finishes.

E. Design Data: Provide design calculations, bearing seal and signature of structural engineer licensed to practice in the State in which the Project is located, showing loads at points of attachment to the building structure.

F. Manufacturer's qualification statement.

G. Executed warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inspect for dents, scratches, or other damage. Replace damaged components.

B. Store in manufacturer's unopened packaging until ready for installation.

C. Store under cover and elevated above grade.

1.6 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Manufacturer Warranty: Provide 1-year manufacturer warranty for rust, corrosion, and manufacturing defects. Complete forms in Owner's name and register with manufacturer.

C. Provide one year manufacturer warranty covering defects of manufacturing and workmanship and rust and corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Mobile Storage Shelving Systems:
1. Provide MetroMax i 5-Shelf Industrial Plastic Shelving Mobile Carts with Solid Plastic Shelving manufactured by InterMetro Industries Corporation, or an approved equal product.

2.2 MOBILE STORAGE SHELVING SYSTEMS - General

A. System Description: Plastic polymer shelving with removable shelf mats. Shelves are constructed of plastic polymers with type 304 stainless steel corners. Shelves and posts shall be rust and corrosion resistant. Shelf mats shall be solid and shall have built-in antimicrobial protection. Shelves shall adjust on 1" (25mm) increments.
   1. Operation: Manual.
   2. Shelving Capacity: 900 lbs total, each unit.
   3. Casters: Polyurethane, 5" diameter, 4 each unit.
   4. Width: As indicated on drawings.
   5. Length: As indicated on drawings.
   6. Height: 6'-8" minimum.
   7. Number of Shelves: Five adjustable shelf units.

B. Accessories:
   1. Bumpers: Manufacturer's standard rubber stops.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Install system components and accessories in accordance with manufacturer's printed instructions.

B. Position system components level and plumb within manufacturer's specified tolerances.

C. Extend rails under stationary shelving units.

D. Position carriages ensuring wheels align properly on rails. Fasten multiple carriages together forming a single movable base.

E. Install shelving with shelf surfaces level and vertical supports plumb; fasten to carriage supports with vibration-proof fasteners.

3.2 ADJUSTING

A. Adjust mobile storage shelving components and accessories to provide for smooth operation of system.

3.3 CLEANING

A. Clean shelving and surrounding area after installation.

3.4 PROTECTION

A. Protect installed system from subsequent construction operations.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 105626

SECTION 112173 - COMMERCIAL LAUNDRY EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Commerical laundry appliances and equipment for washing and drying

1.2 RELATED REQUIREMENTS

A. Section 221005 - Plumbing Piping: Plumbing connections for appliances.

B. Section 260583 - Wiring Connections: Electrical connections for appliances.

1.3 REFERENCE STANDARDS

A. ICC (IMC)-2021 - International Mechanical Code; 2021.

B. ICC (IRC)-2021 - International Residential Code for One- and Two-Family Dwellings; 2021.

C. UL (DIR) - Online Certifications Directory; Current Edition.

D. UL 2158A - Clothes Dryer Transition Duct; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

1.6 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five (5) year manufacturer warranty on washers and dryers.

PART 2 PRODUCTS

2.1 LAUNDRY APPLIANCES

A. Pool Laundry Room Washers: Electric, Stationary, Front Load, Softmount Washer-Extractor
   1. Size: 40lb capacity
   2. Controls: Solid state electronic.
   3. Finish: Stainless Steel
   4. Wash Speed: 42 RPM minimum
   5. Extractor Speed : 980 RPM minimum
   6. Plumbing:
      a. Water Inlets: Two 3/4 inch connections.
      b. Drains: 3 inch diameter connection.
      c. See additional information on drawings.
   7. Electrical:
      a. Voltage: 208V.
      b. Amperage (FLA): 15 Amps (3 Phase).
      c. See additional information on drawings.
   8. Manufacturers:
      a. Provide SYN040 Softmount Washer-Extractor manufactured by Speed Queen by Alliance Laundry Systems, LLC, or a comparable product by one of the following:
      b. B&C Technologies: www.bandctech.com/#sle.
         1) Huebsch by Alliance Laundry Systems, LLC: www.huebsch.com/#sle.
         2) Pellerin Milnor Corporation: www.milnor.com/#sle.
         3) Unimac by Alliance Laundry Systems, LLC: www.unimac.com/#sle.
         4) Substitutions: See Section016000-Product Requirements.

B. Pool Laundry Room Dryers: Electric, Stationary, Front Load, Single-Tier, Tumble Dryer
   1. Size: 55lb capacity
   2. Controls: Solid state electronic
   3. Finish: Stainless steel
   4. Mechanical:
      a. Heat Input: 112,000 BTU/hr minimum
      b. Air Outlet: 8 inches minimum
      c. Airflow: 700 cubic feet
      d. Motor: 0.5 HP fan with 0.5 HP cylinder
   5. Electrical:

a. Voltage: 120V.
b. Amperage (FLA): 12 Amps (Single Phase).
c. See additional information on drawings.

6. Manufacturers:
   a. Provide ST055 Quantum Gold Single-Tier Tumble Dryers manufactured by Speed Queen by Alliance Laundry Systems, LLC, or a comparable product by one of the following:
      1) B&C Technologies: www.bandctech.com/#sle.
      2) Huebsch by Alliance Laundry Systems, LLC: www.huebsch.com/#sle.
      3) Pellerin Milnor Corporation: www.milnor.com/#sle.
      4) Unimac by Alliance Laundry Systems, LLC: www.unimac.com/#sle.
      5) Substitutions: See Section016000-Product Requirements.

2.2 Accessories

A. Dryer Vent Assembly: Comply with ICC (IMC)-2021 and ICC (IRC)-2021.
   1. Exhaust Duct: Aluminum ribbon, 4-inch diameter, comply with UL 2158A, unless noted otherwise on drawings.
      a. Elbows: 26-gauge, 0.018-inch aluminized steel; 45 degree angle, nonsectioned curve; 4-inch diameter.
      b. Clamps: Stainless steel, 3-1/2 to 4-3/4-inch diameter range.
   2. Pest Protection Gate: 26-gauge, 0.018-inch zinc-coated steel, vertical bar gate, manufacturer's recommended size to fit termination.
   3. Label: Where exhaust duct length exceeds 35 feet, provide label or tag identifying duct length. Locate label or tag within 6 feet of duct connection.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify utility rough-ins are provided and correctly located.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Anchor built-in equipment in place.

3.3 ADJUSTING

A. Adjust equipment to provide efficient operation.

3.4 CLEANING

A. Remove packing materials from equipment and properly discard.

B. Wash and clean equipment.

END OF SECTION 112173

SECTION 114000 - FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Food Service Equipment as listed in the itemized specifications and listed in the contract drawings.

1.2 DEFINITIONS:

A. Furnish - Supply and deliver to the project site, ready for unloading, unpacking, setup, assembly, and installation.

B. Install - Will include the actual unloading, unpacking, assembly, erecting/setting in place, leveling, anchoring, protecting, cleaning, and related operations on the equipment to be made ready for utility connections by other trades as indicated.

C. Contractor - All references for the Contractor in this Section 114000 shall refer to the Food Service Equipment Contractor (abbreviated as FSEC). Reference to any other contractor or subcontractor, shall be specific as such:
   1. General Contractor (abbreviated as GC)
   2. Plumbing Contractor (abbreviated as PC)
   3. Electrical Contractor (abbreviated as EC)
   4. Mechanical Contractor (abbreviated as MC)

1.3 RELATED SECTIONS:

A. Refer to General Conditions, Supplementary Conditions, and applicable provisions for additional instructions.

B. Refer to Mechanical Section for applicable provisions and sections regarding mechanical services, including, but not limited to, rough-ins, grease traps, steam traps, drain traps, atmospheric vents, valves, pipes and pipe fittings, ductwork, and other materials necessary to complete final connections to individual items as specified in this Section.

C. Refer to the Electrical Section for applicable provisions and sections regarding electrical services, including, but not limited to, rough-ins, wiring, disconnects, and other materials necessary to complete final connections to individual items as specified in this Section.

D. Work included in other Sections will include provision of any wall, floor, and/or ceiling/roof openings, penetrations, recesses, sleeves, conduits, and equipment pads as required for installation of items included in this section. Also sealing of these openings, penetrations, recesses, sleeves, etc., after installation of the equipment items as required. Such work is not included in this Section. Work included in other Sections -- Disconnection of existing equipment to be relocated and/or reused; and disconnection of existing equipment which will not be reused, shall be as determined, and designated by the Architect in other Sections. Mounting and installation of gas regulators, gas hoses, gate valves, water hammer arrestors, back flow preventers, water filters, faucets, lever drains, and drain lines, and pressure-reducing valves will be performed by the plumbing contractor. Exhaust hoods are to be removed by the Mechanical Contractor. Such work is not included in this section.

E. Work included: The owner may wish to retain equipment that is not going to be reused. Verify all items with the owner prior to removal. If the owner wishes to retain some items, deliver these items to a designated place as directed by the owner. Removal and disposal of existing equipment, which will not be re-used, shall be the responsibility of the Food Service Equipment Contractor. Removal of existing equipment, which will be reused, shall be the responsibility of the FSEC. This equipment shall be removed from the site, stored, cleaned, and delivered ready for final connections by others. Disconnection of utilities performed by others. All existing equipment shall be relocated as per the contract drawings. FSEC shall be responsible for pumping down and properly recovering the existing refrigerant from any systems prior to demolition. The FSEC is responsible for installation of the walk-in cooler/freezer and refrigeration systems, and installation of the new hoods. The FSEC is responsible for mounting any hand sinks or water filter systems sink on the wall. FSEC is to confirm ability and sizing of equipment to be installed and access into the room.

1.4 STANDARDS, LAWS, AND ORDINANCES:

A. Standards: Except and unless otherwise noted, comply with the following standards as applicable to the manufacture, fabrication, and installation of the work of this Section:
   1. American with Disabilities Act (ADA): Comply with requirements, as applicable to this Project.
   2. National Sanitation Foundation (NSF): Comply with the latest Standards and Revisions established by NSF for equipment and installation. Provide NSF seal of approval on each applicable manufactured item, and on items of custom fabricated work.
   3. Underwriters Laboratories (UL): For electrical components and assemblies provide either UL labeled and registered products or, where no labeling service is available, recognized markings to indicate listing in the UL Recognized Component Index.

4. National Fire Protection Association (NFPA): Comply with the applicable sections of the current NFPA codes for exhaust hood, ventilators, duct and fan materials, hood wet chemical fire suppression systems, construction, and installation, as well as any local codes and standards.
5. Wet chemical fire suppression systems for exhaust hoods/ventilators shall comply with UL 300 Standard or most current standard.
6. National Electrical Manufacturers Association (NEMA): Comply with the most current codes or standards.
7. American Gas Association (AGA): Comply with AGA standards for gas heated equipment and provide equipment with the AGA seal. Automatic safety pilots are to be provided with all equipment whenever available.
8. American National Standards Institute (ANSI): Comply with current standards for gas-burning equipment and provide labels indicating name of testing agency. Comply with current codes and standards for L.P. gas cylinder connections, and with applicable standards of the Compressed Gas Association for compressed gas piping. Follow codes for water connection air gaps and vacuum breakers.
9. American Society of Mechanical Engineers (ASME): Comply with ASME Boiler Code requirements for steam generating and steam heated equipment. Provide ASME inspection stamp and registration with the National Board.
10. American Society for Testing and Materials (ASTM): Comply with current requirements for flat glass. Comply with codes for heat-treated flat glass, Kind HS, Kind FT coated, and uncoated glass.
11. National Electric Code (NEC): Comply with current NFPA codes for electrical wiring and devices included with foodservice equipment, and applicable NEMA and NECA standards.
12. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components, and installation.
13. Air Conditioning and Refrigeration Institute (ARI): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components, and installation.
14. Refrigeration Service Engineers Society (RSES): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components, and installation.
15. No CFC refrigerants shall be allowed on this project under any circumstances. HFC refrigerants and components shall be used where available. R290 refrigerant should be used where possible.
16. All walk-in coolers and freezers shall meet the applicable sections of NYECC C403.10.
17. All refrigeration components installation, repairs, and/or associated work on any refrigeration system, self-contained or remote, shall be performed by a Certified Refrigeration Mechanic.

18. All applicable local codes, standards, and regulations and any special local or job site conditions shall be complied with.

1.5 SUBSTITUTIONS:

A. All substitutions for itemized equipment specified will require prior approval of the Foodservice Consultant and owner. Such requests must be made in writing no later than ten (10) business days prior to the bid due date. If approved, an addendum will be issued to all bidders at least five (5) business days prior to bid due date. All requests for substitutions shall comply with conditions and requirements as stated in Section 1.6 below.

B. If custom fabricated items are submitted, and accepted as a substitute for standard manufactured items, these items shall meet the specifications of the specified manufactured items, in general, the fabrication section of this document.

1.6 APPROVED SUBSTITUTIONS OR ALTERNATES:

A. Substitutions approved by addendum as noted in Section 1.5, and/or any alternate manufacturers
   1. The contract documents are designed and engineered using the primary specified manufacturer and model. The Food Service Equipment Contractor shall assume total responsibility for any deviations required due to the utilization of a substitution/alternate manufacturer or model, including but not limited to, fitting alternates into the available space, providing directions to the General Contractor for required changes, and assuming any associated cost for utility, building, architectural, or engineering changes.
   2. The submittal of an alternate manufacturer or model shall indicate agreement to the above stated conditions. At the Owner's sole discretion, failure to comply with any of these conditions, or to supply complete and correct data information shall result in the Food Service Equipment Contractor being required to provide the originally specified manufacturer and model at no additional cost to the owner.
   3. The inclusion of an alternate manufacturer in the Itemized Specifications is not intended to indicate that there is an equal alternate unit to match every primary specified unit. It shall be the responsibility of the Food Service Equipment Contractor to ensure that the alternate unit submitted matches the primary specified unit, including all listed options and accessories, and meets the other project conditions.

4. The Food Service Equipment Contractor shall be responsible for supplying the model, which is equal to the primary specified model regarding general function, features, options, sizes, accessories, utility requirements, finish, operation, and listing approvals. If it is determined by the owner, or their appointed representative, at any time during the construction and installation prior to the final acceptance of the project, that the substitution / alternate model submitted is not equal to the primary specified model, the Food Service Equipment Contractor shall assume all associated costs, and implications required to replace the model submitted with the originally specified brand and model.
5. The Food Service Equipment Contractor's bid will clearly list any substitutions or alternatives to be used, including the manufacturer and model number. The proposal shall also include a manufacturer's specification/data sheet for each substitution / alternate, with any, and all deviations between the specified manufacturer and the alternate manufacturer itemized and listed. Submittal of a manufacturer's specification sheets, shall not be acceptable as the data sheet. Complex alternates such as utility distribution systems, exhaust hoods, walk-in coolers/freezers, custom fabricated items, etc., will require shop drawings specific to this project.
6. Manufacturers not approved for substitutions, or listed as an approved alternate will not be permitted, unless submitted for prior approval as described above in Section 1.5, paragraph A.

1.7 SUBMITTALS:

A. Rough-In Drawings:
1. The Food Service Equipment Contractor shall be solely responsible for the accuracy of the information provided in the submittal packages.
2. In the event utility rough ins have been accomplished before a contract is awarded to the Food Service Equipment Contractor, the FSEC shall check the existing facility and adjust their equipment to suit job site conditions and utilities where possible. If this is not possible, immediately send a letter with reasons, practical solutions, and any costs associated with the proposed solutions to the owner and the Foodservice Consultant.
3. Submit required number of sets as directed by the architect for approval. After approval, reproduce, and supply the required number of distribution prints for the other trades for construction purposes.
4. If the architect utilizes an electronic submittal service or process, after approval, supply the required number of distribution prints for the other trades for construction purposes.
5. Submit minimum 3/8 inch per foot scale rough-in drawings for approval. These drawings shall be dimensioned; showing location of ducts, stubs, floor, and wall sleeves for ventilation, plumbing, steam, electrical, refrigeration lines, and concrete base/recess/curb dimensions as required for equipment. Drawings shall be submitted in a minimum of 24" x 36" format.

6. Verify mechanical, electrical, ventilating rough in, and sleeve penetration locations at project site as required.

B. Shop Drawings:
1. Submit shop drawing sets as directed by the architect for approval. After approval, reproduce, and supply the required number of distribution prints for the other trades for construction purposes.
2. Submit CAD shop drawings in PDF format for items of custom fabrication included in this contract. Shop drawings shall be submitted at a minimum of 3/4 inches per foot scale, and shall show dimensions, materials, construction details, installation, and relation to adjoining work or equipment requiring cutting or close fitting. Shop drawings shall also indicate all reinforcing, anchoring, and related work required for the complete installation of these items. Drawings shall be submitted in a minimum of 24" x 36" format.
3. Before proceeding with the fabrication of any item, the Food Service Equipment Contractor will verify all necessary dimensions and details with all job site dimensions and conditions considered.

C. Submittals:
1. Submit an Equipment Manual with a cover sheet, and detailed information on every item included in the Itemized Equipment List. This information shall include but not limited to items and model numbers, basic description, quantity required, all options and accessories to be provided, exact utility requirements, manufacturer specification sheets, reference to specific shop drawings, etc. Mark each data sheet with the applicable project equipment item number. Highlight model numbers and/or accessories on each sheet for a clear indication of what is included in the submittal. Each data sheet includes NEMA plug and receptacle configuration for applicable items. Every cover sheet and associated detailed submittal shall provide sufficient and complete information to verify that the Food Service Equipment Contractor is providing each item in compliance with the Contract documents.
2. Architect / Foodservice Consultant review of shop drawings, and equipment manuals is for general conformance and compliance with the design concept, and contract documents. Markings, and / or comments shall not be construed as relieving the Food Service Equipment Contractor from compliance with the contract documents. The Food Service Equipment Contractor remains solely responsible for all details and accuracy and for performing their work in a safe, satisfactory, and professional manner.

1.8 OPERATION AND MAINTENANCE MANUALS:

A. Operation and Maintenance Manuals: The Food Service Equipment Contractor will supply a set of manuals for items of standard manufacture on, or before, the date of final acceptance of installation by the owner. Manuals are to be in alphabetical order according to the manufacturer. Each set should include a blank page for quick reference, clearly marked, separating each manual and/ or section within the binder. Electronic versions are acceptable unless printed versions are required by the architect, owner, or construction manager.

B. Submit with the operation and maintenance manuals a list of local service agencies complete with telephone numbers, address, and e-mail information for the authorized agencies to perform the warranty work.

C. Provide a letter of warranty in front of the manual complying with Section 1.14. This letter must include the actual date the warranty begins, and list all labor, service, workmanship, and factory warranty periods.

1.9 AS BUILT AND RECORD DOCUMENTS:

A. Maintain one record set of Foodservice Equipment Plans with any related corrections, revisions, additions, deletions, changes, future items, etc. noted during construction and installation.

B. Provide final sets of shop drawings and equipment manuals with any related corrections, revisions, additions, deletions, changes, future items, etc. noted during construction and installation as specifications record set.

C. These documents shall be provided to the owner before the date of final acceptance of installation.

1.10 DISCREPANCIES

A. If discrepancies are discovered between the drawings and the specifications, the FSEC will notify the Food Service Consultant in writing of any discrepancies discovered and await clarification prior to proceeding with the items or areas in question.

1.11 FOOD SERVICE EQUIPMENT CONTRACTOR QUALIFICATIONS:

A. Submit evidence of compliance with the following qualifications and conditions.
   1. Manufacturers' authorized dealer, able to purchase, distribute, and install all items specified in this project.
   2. Seven (7) years minimum continuous operation under the same company name and ownership.
   3. Successfully completed at least eight (8) installations of similar scope and size during the last two (2) years. Provide references with contact information for verification.

4. Maintain installation staff or have access to qualified personnel with a minimum of seven (7) years' experience in the installation of comparable size and scope projects.
5. Maintain a staff or have access to personnel experienced in the preparation of professional shop drawings and submittals as outlined in related sections.
6. Maintain or have access to manufacturers authorized service personnel together with readily available stock of repair, and replacement parts.
7. Maintain or have access to a fabrication shop with NSF and UL standards and officially listed with labeling requirements. If the fabricator will be a subcontractor for the FSEC, they shall have ten (10) years minimum experience in the fabrication of comparable size, scope, and level of quality projects. The Food Service Equipment Contractor shall submit the fabrication shop company name and credentials to the Foodservice Consultant and owner, who shall have the right of approval or disapproval of this fabricator.

B. Any subcontractor employed by the Food Service Equipment Contractor for this project shall comply with these same qualification requirements.

C. The Architect and/or Foodservice Consultant for the project shall approve the Food Service Equipment Contractor.

1.12 PRODUCT HANDLING:

A. Storage of Materials, Equipment, and Fixtures. The Food Service Equipment Contractor is responsible for receiving and warehousing equipment and fixtures and holding items until the job site is ready for delivery and installation.

B. Handling Materials and Equipment. Verify and coordinate conditions at the job site, particularly door, and/or wall opening sizes and clearances, to assure access for all equipment. Pieces too large for existing site conditions shall be hoisted, crane-lifted, or otherwise handled as required. All special handling equipment charges shall be arranged for and paid for by the Food Service Equipment Contractor and are to be included in the bid price, unless conditions change at the job site, after acceptance of the bid through no fault of the FSEC.

1.13 PRODUCT PROTECTION:

A. The Food Service Equipment Contractor is responsible during the progress of the project to protect their equipment against theft or damage, until final acceptance by the owner. Items should not be delivered to the job site before the site is ready for installation, unless at the request of the owner or the construction manager. All scheduled deliveries should be signed for and the delivery condition noted by the owner or the construction manager.

B. Protect all items before, during, and after installation and protect the associated work and materials of the other trades.

1.14 WARRANTIES:

A. Unless otherwise noted, items furnished shall be fully guaranteed against defects in workmanship and material(s) for two (2) full years from the date of the first event to occur of the following: Start-up for intended use by the owner/operator, Substantial completion of installation of kitchen equipment contract package as agreed to by the owner, or final acceptance of installation by the owner. Should a Temporary Certificate of Occupancy be issued for partial completion of work, the items furnished within that designated area shall be under warranty from the date of issue of the certificate. The Food Service Equipment Contractor or their service agent will make repairs and replacements without charge to the owner within a reasonable time.

1.15 SCHEDULE:

A. Contract acceptance constitutes a guarantee that the contractor can and will obtain materials, equipment, and labor upon notice to proceed to permit overall completion of the entire building project on schedule. The contractor shall coordinate their work with the progress schedule as prepared and updated periodically by the General Contractor, or the Construction Manager.

B. Anticipated delays, not through fault of the Food Service Equipment Contractor, shall be noted in a written notification to the Foodservice Consultant, and the Architect immediately upon the realization by FSEC that delays are possible, or probable.

C. Extra charges from rush orders, special handling, overnight UPS/FedEx, air shipments, etc., to meet the required schedule will be paid by the Food Service Equipment Contractor, if insufficient time was allowed in placing factory orders.

D. Failure of manufacturers to meet promised delivery dates will not grant relief to the Food Service Equipment Contractor for failure to meet schedules unless it can be proven in writing with supporting data (i.e., proof of dates orders were placed) that orders were received by the manufacturer with reasonable lead times.

PART 2 - EQUIPMENT

2.1 GENERAL:

A. Refer to the schedule on Foodervice Drawings and Section 4, Itemized Specifications, included in this Section.

2.2 MATERIALS:

A. Quality Standards for Metals:
   1. Stainless Steel: Type 302/304, 4 finish where exposed, 2B finished where not exposed.
   2. Steel Sheet: Hot-rolled carbon steel.
   3. Galvanized Steel Pipe: Welded or seamless, schedule 40, galvanized or heavier.
   4. Steel Structural Members: Hot rolled or cold formed, carbon steel unless stainless steel is indicated.

B. Quality Standards for Plastic Laminates:
   1. Comply with current NSF Standards.
   2. Applied directly over 3/4" thick close-grained plywood, Grade A/B, or better of selected, smooth, sanded stock to ensure a smooth ripple-free laminated surface. OSB, MDF, or particleboard panels are not considered acceptable. If a specified plywood substrate is unavailable, submit specifications and samples of alternate material for approval.
   3. Adhere to substrate materials with manufacturer recommended waterproof and heatproof contact cements only.
   4. Exposed faces and edges shall be faced with 1/8" thick material. Corresponding backs are to be covered with approved backing material. No unfinished exposed plywood surfaces will be acceptable.
   5. All plastic laminate surfaces are to be finished without waves and unsightly joints.
   6. Color and texture as selected by the Architect/Interior Designer.

C. Insulation:
   1. For low temperature applications, such as ice bins, cold pans, or fabricated under counter freezers or refrigerators, use urethane, rigid board foam, or foamed-in-place; not less than two (2) inches thick, except that vertical surfaces of cold pans and ice bins may be one (1) inch thick. Insulation shall be bonded at joints with urethane or polyurethane expanding foam to fill all voids and prevent condensation on exterior. Polystyrene foam will not be acceptable.
   2. For heated type applications, use mineral wool, a minimum of one (1) inch thick.
   3. All insulation shall be fully encased, or enclosed.

D. Joint Materials:
   1. Sealants: Silicone based, liquid elastomeric sealant, non-solvent release type. Sealants shall be NSF listed, and FDA approved for use in food zones. Installation shall comply with the applicable requirements of NSF Standards.
   2. Gaskets: Solid or hollow neoprene or PVC light grey, self-adhesive or prepared for either adhesive application or mechanical attachment.

E. Paints and Coatings:

1. Provide the types of painting and coating materials which, after drying or curing, are suitable for use in conjunction with foodservice and which are durable, non-toxic, non-dusting, non-flaking, mildew resistant, and comply with all governing regulations for foodservice.
2. Pretreatment. All metal surfaces to be painted are to be cleaned and/or chemically etched as per the recommendations of the manufacturer for the finish coating that is to be applied.
3. Raw metal surfaces are to be coated with suitable primer/filler paint before application of finish coat.
4. Sound Deadener: NSF listed sound deadening material, latex sound deadener, for internal surfaces of metal work, and underside of metal counters, dish tables, sink bowls, and drain boards. Install "tacky tape" between work top, and underbracing, or framing.

2.3 FABRICATED COUNTERS, TABLES, AND METAL PRODUCTS:

A. General Fabrication Requirements:
1. Remove burrs from sheared edges of all sheet metal to eliminate cutting hazard. Maintain flat, smooth surfaces without damage to finish.
2. Reinforce metal at locations of hardware and accessory attachments wherever metal is less than 14-gauge thickness or requires mortised or recessed installation. Weld in place on concealed side of work. Reinforcements will not show on finished, exposed surfaces.
3. Exposed screws or bolt heads, rivets, or butt joints filled with solder are not acceptable. Where fasteners are permitted, provide Phillips head or oval head machine screws. Cap threads with acorn nuts, unless fully concealed and inaccessible. Provide nuts and lock washers where necessary or indicated. Match fastener material and finish with finish of metal being fastened.
4. Where components of fabricated metal work are indicated to be galvanized or steel and involve welding of the metal, complete the fabrication, and clean all welding slag, then paint with a high-grade aluminum color, rust-preventative spray paint.
5. Welding and Soldering:
    a. Welding: All welded parts shall be non-porous and free from imperfections, pits, cracks, or discolorations. Stainless steel joints and seams shall be heli-arc welded, ground smooth and polished to a No. 4 finish. Welds of galvanized steel shall be ground smooth.
    b. Materials 18-gauge or heavier shall be welded. Seams and joints are to be shop welded or soldered as indicated. Welds must be ground smooth and polished to match the original finish.
    c. Where galvanizing has been burned off, the weld shall be cleaned and then painted with a high-grade aluminum color, rust-preventative spray paint.

6. Provide removable panels for access to mechanical and electrical service connections and components concealed inside equipment, but only where other means of access is not possible and not indicated through other work.
7. Where ends of equipment, rear or end splashes, shelves, etc., are open after fabrication, they are to be enclosed by forming metal and welding, adding filler sections, if necessary, to close entire opening flush to walls, adjacent fixtures, or equipment.
8. Coved Corners: Stainless steel foodservice equipment shall have a minimum of 1/4" radius coves in horizontal and vertical corners, and intersections, and are to be constructed to NSF standards.
9. Set each item of non-mobile and non-portable equipment securely in place, level and adjust to correct height. Anchor to supporting substrate where indicated and where required for sustained operation and use without shifting or dislocation. Conceal anchorages where possible. Where indicated or required for safety of equipment operator, anchor equipment to floor or wall. Where equipment is indicated to be anchored to floor, provide legs with adjustable flanged feet. Install two anchors on each foot.
10. Quality of Work: All work to be of the highest quality in the trade. Field verify all dimensions before fabricating, adjust where necessary to conform to building and job site conditions, neatly fit around pipes, offsets, and other obstructions. Fabricate only in accordance with approved shop drawings.
11. All items are to be UL listed and NSF certified. All items must have a visible NSF label on each piece of equipment. If equipment has an electrical component, these items must have a visible UL label in addition to the NSF label.

B. Metal and Gauges:
1. Unless otherwise indicated in Itemized Equipment Specifications, fabricate exposed metalwork of stainless steel, and fabricate the following components from the gauges of metal as indicated:
    a. 14-gauge 304 stainless steel with #4 finish for all sinks; drain boards, table and counter tops, reinforcements, gusset plates, and hat channels.
    b. 16-gauge 304 stainless steel with #4 finish for all wall shelves, under shelves, inserts, trays, single-pan drawers, or door fronts.
    c. 18-gauge 304 stainless steel with #4 finish for all wall cabinets, table, counter base cabinets, skirting, enclosure panels, trim strips, and corners, double-pan drawer fronts or doors, hoods, ventilators, access panels, or covers.
    d. Type 304 stainless steel is to be used as the standard construction.

C. Fabrication Methods:

1. Fabricate metal work surfaces by forming, and welding to provide seamless construction, using welding rods matching sheet metal, or welding on stainless steel using stainless steel filler rods, grinding, and polishing to match surrounding surfaces. Where necessary for disassembly, provide waterproof field joints with gasket and concealed bolting. If field welded field joint is indicated, provide a straight, smooth, edge.
2. Reinforce work surfaces at a minimum 24 inches on center in both directions with galvanized or stainless steel structural members as indicated.

D. Top Construction:
1. All tops, unless otherwise indicated, shall be constructed of 14-gauge stainless steel. Exterior edges not adjacent to walls or other equipment shall be turned down 1 ½" with ½" 45-degree turn in. Tops adjacent to walls shall be turned up 6" with 45-degree angle to wall and down ¾". Tops adjacent to other equipment shall be flanged straight down 2". Sound deadening material shall be provided between frame members and stainless-steel tops.
2. The edges of dish table tops not adjacent to walls shall be turned up 3" and rolled down 1-1/2" with corners bull nosed. Dish table tops adjacent to walls shall be turned up 6" back 2" on a 45-degree angle and down ¾". All horizontal edges and internal corners of dish tabletops shall be coved on a 5/8" minimum radius. Ends of backsplashes shall be closed, welded, ground smooth and polished.
3. Edges of preparation counter tops, with sinks, not adjacent to walls shall have nonspill edge, unless specified otherwise. Preparation counter tops, with sinks, adjacent to walls shall be turned up to 6", back 2" on a 45-degree angle and straight down ¾". All horizontal edges and internal corners of preparation counter tops shall be coved on a 5/8" minimum radius. Ends of backsplashes shall be closed, welded, ground smooth and polished. Backsplashes of counter tops with sinks shall be pierced on 8" centers over sinks.
4. All tops shall be reinforced on the underside with enclosed channels running from front to back with center bracing where required to hold tops flat.
5. Metal tops shall be one-piece welded construction, including joints only where necessary.
6. Fasten tops to supporting frames, cabinet bases, or structural members with stainless steel welded stud bolts and stainless-steel cap nuts.
7. Professionally designed bolt together field joints, trim strip, or other commercial joint material to suit requirements shall be used only where it is specified.
8. Welded Field Joints, where specified, will be welded, ground, and polished to match surrounding surfaces. Excessive distortion from the welding will not be acceptable.

E. Structural Components:
1. Unless otherwise indicated, provide framing of minimum 1-1/4" O.D. round pipe or tubing, with mitered and welded joints and gusset plates, ground smooth. Provide 16-gauge stainless steel tube for exposed or concealed framing.

2. Where indicated, enclosed bracing channels of 1" x 4" x 1" are to be used, of material specified, 14-gauge, and attached to tops as outlined in other sections.

F. Field Joints:
1. For any field joint required because of size of a particular item, use a butt-joint, reinforced with formed angles of same material on underside, attached with stud bolts. If bolt together joint is required, provide with concealed stainless-steel bolts and nuts, with waterproof gasket between angles, and seal with food grade and NSF-listed silicone sealant. If specified as field-welded joint, weld and fill with stainless steel filler rod, grind, and polish to match surrounding material.
2. Field joints shall be located for practical construction of sizes convenient for shipping and entry into building spaces. All field joints shall be fully continuously welded with the same type of metal, ground smooth and polished to the original finish of the metal.

G. Open Pipe Bases:
1. All open bases shall be constructed of 1-5/8″ OD 16-gauge stainless steel tubular uprights and cross braces fully welded together, ground smooth and polished. Top of cross braces shall 12″ above floor.
2. Uprights shall be fitted on the floor with adjustable, stainless-steel feet as specified inserted into uprights with inside threads to eliminate any possibility of threading collecting dirt and other matter. The tops of legs shall be fitted into die-stamped fully enclosed stainless-steel gussets welded to the reinforcing channels on the underside of stainless-steel tops.
3. Use stainless steel adjustable bullet feet or stainless steel adjustable flanged feet with mounting holes as indicated. Legs are to be spaced sufficiently close enough together to support the weight of items on top of table or counter, and in no case more than 5′-0″ on center.
4. Tables 6′-0″ long and under shall have four (4) legs and tables 7′-0″ long shall have six(6) legs. Legs on dish tables shall be spaced not more than 5′-0″ apart unless specified otherwise.

H. Cabinet Bases and Bodies:
1. All cabinet bodies and bases shall be enclosed with 18-gauge stainless steel. Exterior vertical corners shall be square. Bodies and bases shall be mounted on high sanitary adjustable counter legs with toe kicks unless otherwise noted.

I. Legs & Cross rails:

1. Equipment legs and cross rails shall be 1-5/8" O.D., 16-gauge type 304 stainless steel tubing. Fit legs with stainless steel adjustable bullet feet or stainless steel adjustable flanged feet with mounting holes as indicated. Cross rails are to be notched at the end and welded to legs as specified. All welds are to be continuous, ground smooth, and polished to match surrounding material. Tack welds are not acceptable. Where flanged feet are specified, anchor to floor with either expanding, driven in stainless steel pins or stainless-steel lag bolts with expanding anchors as indicated.
2. Stainless Steel Gussets to be 16-gauge stainless steel exterior, to accept 1-5/8"O.D. stainless steel tubing, with Allen set screw for fastening and adjustment. Reinforced with 12-gauge mild steel insert welded in interior. To be welded to framing members as indicated.
3. Legs shall be fastened to equipment with gussets, as follows:
    a. Sinks to have gussets welded to stainless steel channels, 14-gauge or heavier, anchored to either drain boards, or sink bowls as indicated, with stainless steel welded stud bolt.
    b. Metal Top Tables and Dish Tables to have gussets welded to stainless steel channels, unless otherwise indicated, 14-gauge or heavier, anchored to top with stainless steel welded stud bolts.
    c. Wood Top Tables to have gussets welded to stainless steel channels, 14-gauge or heavier, anchored to underside of top with stainless steel screws through slotted holes to allow for top expansion.

J. Casters:
1. Type and size as specified on drawings and specifications, NSF approved, not less than 5” diameter; heavy-duty ball-bearing, solid or disc wheel with non-marking grease proof rubber, neoprene or polyurethane wheel as specified. The minimum width of tread shall be 1- 3/16”. Minimum weight capacity shall be 250 pounds per caster unless otherwise noted in itemized specifications.
2. Unless otherwise indicated, each equipment item on casters is to be supplied with two (2) swivel-type casters and two (2) swivel-type casters with foot brakes. Brakes are to be on front casters for equipment against walls and on opposing corners of equipment not normally against walls.

K. Shelves:
1. All under shelves and interior shelves shall be constructed of 18-gauge stainless steel.
2. Under shelves on open base tables shall be welded to the legs.
3. Construct solid shelves under pipe base tables of 16-gauge stainless steel, with 1-1/2" turndown front and ends, bottom edges turned in additional 2” 45-degrees, and 1-1/2" turn-up at rear, unless indicated otherwise. Notch and fully welded to pipe legs as necessary, ground smooth and polished to match surrounding material. Tack welds are not acceptable. In fixtures with enclosed bases, turn up shelves at both rear and sides.

4. Interior shelves of cabinet bodies and bases shall be adjustable and removable unless specified otherwise. The sides and rear edges of the shelves shall be turned up and front turned down. Shelves shall be braced on the underside. Where plumbing and other appurtenances pass through counter bases, open chases, shall be provided to accommodate piping.
5. Elevated Shelves: All elevated shelves shall be constructed of 16-gauge stainless steel and shall be turned down 1-1/2" with ½" 45 degree turn in on front and ends. Freestanding shelves, unless specified otherwise, shall be mounted on 1 5/8" OD stainless steel tubular uprights mounted to counter tops.

L. Sinks:
1. All sinks shall be constructed of 14-gauge stainless steel with the back, bottom and front formed of one (1) continuous sheet of metal with ends and partitions welded in place. All vertical and horizontal corners of sink compartments shall be coved with metal on a 5/8" (minimum) radius. The bottom of sinks is to be creased and pitched toward drains.
2. Sink inserts shall be constructed the same as specified for sinks above with coved corners. Sink inserts shall be welded integral with stainless steel tops. Fully fabricated 14-gauge Stainless Steel construction. Deep Drawn or stamped bowls are not acceptable. Sink bottoms are to be creased and pitched toward drains.
3. Cove interior vertical and horizontal corners of each tub not less than 5/8-inch radius, die formed. Outer ends of drain boards have roll rim risers not less than [3] inches high.
4. Cove interior vertical and horizontal corners of each tub not less than 5/8-inch radius, die formed. Outer ends of drain boards have roll rim risers not less than [3] inches high.
5. Punch rear splashes with holes for faucets as indicated 2-1/2" below top edge. Verify center-to-center spacing with faucet specified.

M. Plumbing Fixtures:
1. Where exposed or semi-exposed, provide piping in bright chrome plated brass or polished stainless steel and copper where not exposed. PVC is not acceptable for cold water drains (ice bins, soda fountains, condensate from refrigeration) unless they were allowed by local codes. PVC is not acceptable on any drains where hot water will flow or for pressured water lines.
2. Vacuum Breakers: Provide with foodservice equipment items where specified.
3. Unless otherwise indicated, furnish lever or twist waste drains as specified on all sinks, with removable flat strainers and 2" IPS outlet size. If basket drains are specified, there will be all stainless-steel construction.
4. Handle (lever or twist, as specified) to extend to the front edge of sink. Handle to be supported and protected by stainless steel bracket where indicated. No riveting, screws, or soldering permitted to fit drains to sinks, with all parts of drains easily removable for servicing and replacement.

5. Water pans for hot food tables shall be fitted with 1″ drains with chrome-plated brass standpipes or manifolded together to a single gate valve for draining as indicated.
6. All faucets furnished with equipment included in this Section shall comply with the current NSF and Lead-Free Standards. No lead products are acceptable on this project and need to conform to lead testing per NYSOCCRR sub part 67-4. When the itemized specifications list a faucet by manufacturer and model, the Contractor shall verify that the listed faucet complies with this requirement. If the listed faucet does not comply, the Contractor shall notify Foodservice Consultant immediately and submit for approval a similar model, which does comply, from the same manufacturer where possible. Provide mounting kit for all splash mounted faucets to the plumber for installation. Mounting kits depend on faucet requirements.

N. Electrical Materials and Components:
1. Provide standard materials, devices and components as recommended by the manufacturer or fabricator, selected, and installed in accordance with NEMA standards and recommendations as required for safe, efficient use, and operation.
2. Components shall bear the UL label, or be UL recognized, with the whole item being UL listed.
3. Confirm all electrical requirements for the project, including but not limited to, actual voltages available, single, or three-phase availability, etc.
4. Electrical work for custom fabricated equipment shall be completely pre-wired to a junction or pull box mounted on the equipment, all wires clearly marked and labeled for outlet or item served. Counters should be wired for a single connection point at the job site wherever possible and specified. Verify local requirements for UL Listing on complete assembly and provide if required.
5. Custom fabricated refrigeration units shall be provided with vapor proof light fixtures with shatterproof polycarbonate lamp shields and automatic switches. All wiring shall be concealed if possible.
6. Controls, Switches, and Receptacles: Provide recognized commercial grade signal lamps, switches, controls, and switches as indicated. All such units to be complete with pilot lights, permanent signs, and graphics to assist the user of each item. Provide stainless steel cover plates on all electrical boxes and switches; these are always to be located out of heat zones, easily accessible, and in locations that prevent accidental contact by staff.
7. Convenience Outlets and Power Receptacles:
    a. Make cutouts and install appropriate boxes or outlets in fabricated fixtures complete with wiring, conduit, outlet, and stainless-steel cover plate.
    b. GFCI outlets shall be furnished where adjacent to sink compartments as per the National Electrical Code.
8. Plugs and Cords: Where cords and plugs are provided, they shall comply with the National Electrical Manufacturers Association (NEMA) requirements. Indicate NEMA configuration for each applicable item.

9. Heating Equipment:
    a. Electric heating equipment should be so installed as to be readily cleanable or removable for cleaning.Heating Equipment:
    b. Steam heated custom fabricated equipment shall be a steam coil/heat exchanger design, and will include all necessary control valves, components, and moisture traps located and shall be installed and located in an accessible position.
10. Motors are to be enclosed type, except drip-proof type where not exposed to dust or moisture condition. Ball bearings or sleeve bearings are acceptable on small-timer motors; moisture resistant windings, horsepower, and duty-cycle ratings as indicated.
11. Internal Wiring of Fixtures and Equipment:
    a. The FSEC shall be responsible for internal wiring of electrical devices built into fabricated equipment items. Wiring is to be enclosed in metal conduit or an electrical chase where indicated, to an accessible pull-box, with all wires clearly labeled. For any item shipped in sections, all wiring shall be properly connected internally to a single connection point and verified by the FSEC.
    b. Furnish dishwashers, and conveyors internally wired to junction boxes, or distribution panel as specified; including all required switches, motors, immersion heaters, solenoids, and other components required for proper operation.
    c. Where light fixtures are specified or detailed as part of counters, cases, or fixtures; light fixtures, lamps, and shields shall be furnished and installed. If fluorescent light fixtures are specified, warm white lamps are to be used unless otherwise specified and ballasts shall be included. Shatter shields shall be provided for all light fixtures.
    d. All wiring shall conform to the National Electrical Code and shall be UL listed.
    e. Exposed flexible steel conduit on kitchen equipment shall be neoprene jacketed Seal Tite conduit equal to Anaconda type UA/UL approved, complete with approved liquid-tight connectors on each end and designed to provide electrical grounding continuity.
    f. Exposed electrical conduit used in kitchen wet area applications, except for flexible connections, shall be rigid galvanized steel. Thin wall conduit (EMT) shall not be permitted for wet areas. Exposed outlet boxes shall be liquid-tight type, with threaded hubs.

O. Enclosures:
1. Provide enclosures, including panels, housing, skirts, trim panels, operating components, mechanical, and electrical devices associated with the food service equipment unless specifically indicated otherwise.

P. Doors:

1. Metal doors shall be double-cased stainless steel, 18-gauge with corners welded, ground smooth and polished. The inner pan shall be fitted tightly into the outer pan with a sound deadening material such as Styrofoam used as a core. The two pans shall be tack welded together and joints sealed. Door thickness to be 3/4".
2. Wood doors are to be constructed as detailed. If Formica or other plastic surfaces are used, sides and backs must be laminated as specified on plans or specifications.
3. Hinged Door Hardware: Hinged doors shall be mounted with heavy duty NSF approved hinges with pulls. Catches shall be heavy-duty magnetic type, unless otherwise indicated. Door hardware to be provided which will allow doors to maintain free egress out of the inside of the inside of walk-in freezers, walk-in coolers, and other occupied walk-in equipment.
4. Sliding Door Hardware: Sliding doors shall be mounted on large, quiet ball bearing rollers with quiet nylon wheels in 14-gauge stainless steel overhead tracks. Rollers to be easily replaceable and doors to be removable without the use of tools (lift out). Door hardware to be provided which will allow doors to maintain free egress out of the inside of the inside of walk-in freezers, walk-in coolers, and other occupied walk-in equipment.
5. All hardware used must be identified with the manufacturer's brand name, and part number on shop drawings so that broken or worn parts may be easily obtained and replaced.

Q. Drawer Assemblies:
1. Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with fully enclosed housing. Slide assembly consists of one pair of 200-pound capacity, 300 series stainless steel, full extension, side-mounting, self-closing type, with stainless steel ball-bearings and positive stops. Drawers have side and back enclosure panels, front spacer angle, two drawer carrier angles, secured to slides and stainless-steel front. Drawer pulls shall be stainless steel full grip type with frame beveled edge.
2. Unless otherwise indicated, drawers for general storage are to have a removable 20"x 20" x 5" deep stainless-steel pan. Drawers intended to hold food products are to be designed to hold standard 12" x 20" stainless steel food pans up to 4" deep in a stainless-steel assembly.
3. Drawer fronts are double-pan construction, ¾" thick, and 18-gauge stainless steel, welded, ground, and polished. The back pan is tightly in-fitted, tack welded and sealed. Sound deaden with rigid insulation material.
4. Provide drawers with replaceable soft neoprene bumpers or, for refrigerated drawers, a full perimeter soft gasket.

R. Sound Deadening:
1. Sound deaden underside of metal tops, drain boards, under shelves, cabinet interior shelves, etc., above the underbracing, reinforcing, or framing only.

2. Sound Deadener: NSF listed sound deadening material, latex sound deadener for internal surfaces of metal work, and underside of metal counters, dish tables, sink bowls, and drain boards. Install “tacky tape” between work top, and underbracing, or framing.

2.4 REFRIGERATION:

A. General:

1. All refrigerant and associated components shall comply with the latest code requirements and shall comply with the latest Federal Regulations for energy efficiency. Walk-In coolers or freezers need to include the following: automatic door closing device, power air curtains on doors, heated triple pane windows on cooler and freezer doors, high efficiency lighting or automatic light switches, R-25 insulation in cooler walls, doors, and ceilings, R-32 Insulation in freezer walls, doors, and ceilings, and R-28 insulation in walk-in cooler and freezer floors. Condensing units shall be equipped with PSC fan motors and evaporator fans shall utilize the ECM type fan motors. Refrigerants must comply with the latest type required by Federal Regulations and use R290 refrigerant where possible.
2. Wiring for walk-in refrigerator and freezer cabinets shall be UL approved type from exterior junction boxes to internal components, with insulation, unless local codes require metallic conduit (EMT or Greenfield). For freezer applications, Seal-Tite Flex or approved equal shall be used. Lighting receptacles, and door switches shall be mounted weatherproof boxes. All penetrations to be insulated with expanding foam and sealed to prevent condensation moisture buildup.
3. Furnish either single, or multiple condensing units, or a rack refrigeration system as specified and/or recommended by the manufacturer for the items on the equipment schedule. Furnish all components necessary for a complete installation of the system, including coils, receivers, compressors, motors, motor starters, mounting bases, vibration isolation units, fans, dryers, valves, piping, insulation, gauges, winter control equipment, etc.
4. All refrigerant and associated components shall comply with the latest code requirements. No CFC refrigerants or associated components shall be allowed on this Project. HFC refrigerants and components shall be used where available. HCFC refrigerants and components, with a minimum 2010 phase-out date and intermediate replacement refrigerants, are to be used only when HFC refrigerants are not available.
5. The minimum outdoor operating ambient temperature for design of units is -10 degrees Fahrenheit, unless otherwise specified. The maximum indoor design temperature for the operation of compressor units is 95 degrees Fahrenheit. The maximum outdoor ambient design temperature shall not be less than 100 degrees Fahrenheit. Special attention is to be given to conditions at mounting locations of condensing units, such as sun exposure, restricted air flow and ventilation, fences, walls, roof color, and materials.

B. Components:
   a. Expansion Valves: Remote refrigeration system shall be complete with thermostatic expansion valves at the evaporator coils.
   b. Thermometers: Fabricated refrigerated compartments to be fitted with either flush dial or digital thermometers as specified on individual items. The thermometers shall be adjustable and calibrated after installation. Accuracy to be +/- 2 degrees Fahrenheit.
   c. Hardware: Refrigerator hardware for fabricated refrigerator compartments shall be heavy duty components, NSF Listed. Use self-closing, heavy duty edge mount style hinges, with Spring Kit. Latches to be magnetic edge mount type, with cylinder locks, unless specified or detailed otherwise. All doors and drawers for walk-in coolers/freezers and reach-in refrigerated compartments, both fabricated and standard shall be fitted with cylinder locks. Door hardware to be provided which will allow doors to maintain free egress out of the inside of the inside of walk-in freezers, walk-in coolers, and other occupied walk-in equipment.

C. Cold Pans:
   1. Ice pans, refrigerated pans, and cabinets shall be provided with breaker strips or other insulation where adjoining top or cabinet face materials to prevent transfer of cold and condensation problems.
   2. All open-to-to-mechanically cooled custom fabricated, standard buy-out refrigerators, and / or cold pans shall comply with the latest NSF Standard #9 requirements.

D. Refrigerated Equipment Ventilation:
   1. Adequate ventilation shall be provided for custom fabricated equipment with integral refrigeration condensing units, both built-in and drop-in. If flow through ventilation cannot be provided, provide flow direction partitions and an additional fan capable of cooling the condensing unit. If in the opinion of the Food Service Equipment Contractor or Refrigeration Subcontractor additional room ventilation is required to ensure correct operating temperatures of standard buy-out, custom fabricated, remote refrigeration condensing units, or compressor rack assemblies, they shall so state in a letter to the Architect for evaluation and decision.

2.5 MISCELLANEOUS:

A. Reasonable quietness of operation of equipment is expected, and the Foodservice Contractor will be required to replace or repair any equipment producing excessive noise at no expense to the owner. This includes but is not limited to bumpers and gaskets for doors and drawers, and sound deadening or insulation where specified and practical.

B. Manufactured Equipment Items: Furnish items as scheduled or herein specified. Verify dimensions, spaces, rough in, and service requirements, as well as electrical characteristics before ordering. Provide trim, accessories, and miscellaneous items for complete installation.

C. Nameplates: Whenever possible, locate nameplates and labels on manufactured items in an accessible position, but not within the normal view of customers.

D. All items must have a visible NSF label on each piece of equipment. If equipment has an electrical component, these items must have a visible UL label in addition to the NSF label.

PART 3 - EXECUTION

a.

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3.2 SITE EXAMINATION:

A. Verify site conditions under the provisions of the General Conditions, Supplementary Conditions, and applicable provisions of other Sections. Notify the Architect, in writing, of unsatisfactory conditions for proper installation of foodservice equipment specified in this section.

B. Verify that all required service utilities are available, and of the correct characteristics in the required locations. Notify the Architect, in writing, of any problems or conflicts with food service equipment specified in this section.

C. Verify wall, column, door, window, and ceiling locations and dimensions. Fabrication and installation should not proceed until dimensions and conditions have been verified and coordinated with fabrication details.

D. Verify that necessary wall reinforcement or backing has been provided for wall-mounted equipment. Coordinate with the General Contractor for placement of such backing during wall construction.

E. Verify that ventilation ducts are of the correct characteristics and in the required locations.

3.3 SUPERVISION:

A. A competent supervisor employed by the Food Service Equipment Contractor shall be always present during progress of the FSEC's work.

B. A competent supervisor employed by the Food Service Equipment Contractor shall be always present during work by any of the FSEC's subcontractors.

3.4 SITE CLEANUP:

A. Throughout the progress of their work, the Food Service Equipment Contractor shall keep their working area free from debris, and shall remove all trash, rubbish, etc., daily. At no time is the FSEC to allow any trash, debris, rubbish, crating, boxes, packaging, etc. to accumulate at the job site. At the completion of their work, the FSEC shall leave the premises in a clean and finished condition.

3.5 INSTALLATION:

A. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved. Install items as per each manufacturer's installation manual.

B. Set each item of non-mobile and non-portable equipment securely in place, leveled, and adjusted to correct height. Anchor where indicated and where required for sustained operation and use without unnecessary movement. Conceal anchors wherever possible. Adjust counter tops and other work surfaces to a level tolerance of (+/-) 1/16" or better.

C. Complete field assembly joints in all by welding, bolting / gasketing or as otherwise indicated and specified. Grind all welds smooth and restore the finish to match surrounding materials as specified.

D. Provide anchors, supports, bracing, clips, attachments, etc., as required to comply with the local seismic restraint requirements.

E. Verify, and coordinate mounting heights of all wall shelves and equipment with equipment located below for proper clearances.

F. Insulate contact points between dissimilar metals to prevent electrolysis. Cut, punch, and drill components for outlets, fixtures, piping, conduit, and fittings as required. Coordinate with other trades and provide holes in food service equipment for plumbing and electrical service to and through the fixtures as required or indicated. This includes welded sleeves, collars, ferrules, or escutcheons. These services are to be located so that they do not interfere with intended use, and / or servicing of the fixture.

G. Provide sealants and gaskets around each unit to make joints airtight, waterproof, vermin-proof, and sanitary for cleaning purposes. At internal corner joints, apply sealant or gaskets to form a sanitary cove. The shape exposed surfaces of sealant slightly concave. Sealant filled or gasketed joints will be acceptable up to 3/8" joint width. Wider joints are to be provided with a matching metal closure or trim strip with sealant application to each side of strip.

3.6 ADJUSTING:

A. Repair or replace equipment that is found to be defective in its operation, including units that are operating with excessive noise or vibration.

B. Test and adjust equipment, controls, and safety devices to ensure proper working order and conditions.

3.7 CLEANING AND RESTORING FINISHES:

A. Restore damaged finishes, polish exposed metal surfaces, and touch-up painted surfaces. Replace work, which cannot be successfully restored.

B. After completion of installation, and completion of other major work in foodservice areas, remove all protective coverings, films, etc., and clean foodservice equipment.

C. Clean and polish glass, plastic, hardware, accessories, fixtures, and fittings and leave in a condition ready for the owner to sanitize and use.

3.8 EQUIPMENT START-UP, TESTING, AND DEMONSTRATION:

A. Prior to final connections by other trades, the Food Service Equipment Contractor is responsible for inspecting and verifying the readiness of all utilities. FSEC to coordinate a site meeting with all trades required to review and approve all rough-in and accessory items that meet the equipment requirements per the manufacturer's recommendations. A written report shall be submitted by the FSEC to the architect and/or consultant.

B. The Food Service Equipment Contractor is to test and start up all equipment prior to the equipment demonstration. Any problems should be addressed prior to the training and a written report should be submitted by the FSEC to the architect and/or consultant.

C. The Food Service Equipment Contractor is planning for a demonstration of food service equipment operation and maintenance in advance with the owner / operator. This training session for all equipment should be provided on one day or a few consecutive days pending approval by the owner/operator. Demonstrate all equipment to familiarize the owner / operator with operation and maintenance procedures including periodic preventative maintenance measures required. Include an explanation of service requirements, and simple on-site service procedures as well as information concerning the name, address, and telephone number of a qualified local source of service. The individual performing the demonstration should be knowledgeable of the operating and service aspects of the equipment. The FSEC shall provide a written attendance sheet for all attendees including owner/operator, FSEC representative, and all equipment demonstrators. Failure to provide this submittal will hinder the closeout of the project.

PART 4 - ITEMIZED SPECIFICATIONS:

4.1 **HIGH SCHOOL ITEMIZED SPECIFICATIONS ITEM:**

A. HS-01 & HS-02
   1. QUANTITY: 2
   2. MANUFACTURER: AVTEC
   3. MODEL: EA2-60-132-30-ECOARCH
   4. DESCRIPTION: EXHAUST HOOD
      a. Provide Avtec Exhaust Hood per detail drawings as shown on plans and in accordance with the following specifications and mounted at 80″ AFF to the bottom of the hood:
         1) The dry filter type hood is a Type I, commercial kitchen, U.L. 710 listed ventilator canopy, approved for use over 400- and 600-degree F. Ventilator canopy shall be size and shape as shown on drawing and shall be complete with cartridge style extractors, concealed grease trough, removable grease cup, and without a fire damper in exhaust duct. This non compensating exhaust only ventilator canopy is intended for use over light to heavy-duty types of cooking appliances. The hood shall have the size, shape, and performance specified in the contract documents. The hood sections are approximately 11′ 0″ x 5′0″ x 30″ high with exhaust collars as shown on the detail drawings. The total of all sections is to exhaust a total of 3,500 CFM. Exhaust duct collar to be fully welded 4" high with a 1" flange on the front edge of the hood. Ventilator canopy is to include temperature sensors in the duct to sense heat from cooking equipment and automatically energize the exhaust and makeup air systems per IMC-2006 507.2.1.1. Control wiring to include a 15-minute delay timer to allow cooking equipment to cool down after cooking is completed to prevent fans from cycling on/off. This heat sensor is to be exposed in the duct area of the hood to promote faster response times and facilitate cleaning. Wiring from the sensor to the control panel shall be factory installed in the unit. Duct sizes and static pressure requirements are shown on the contract drawings. The unit shall have a remote fire cabinet mounted on the wall as shown, complete with an electrical control system mounted on the hood.

2) The electrical control system is to be designed to thermostatically activate the exhaust fan for an exhaust hood, whenever elevated temperatures are sensed in the exhaust system. This option will meet the requirements of IMC 507.2.1.1 by providing a thermostat mounted in the duct area of the hood to sense increased exhaust temperatures. Controls shall be listed by ETL or UL. The control enclosure shall be NEMA 1 rated and listed. The control enclosure shall be constructed of stainless steel. Thermostat located in the duct area shall be chrome plated to match the hood. The thermostat is a factory set at an activation temperature of 105°. Once the exhaust temperature reaches the set-point, then the normally open contacts will close, and the exhaust and supply fan will be activated. The panel will also contain a timer to prevent cycling of the fans after the cooking appliances have been turned off and the heat in the exhaust system is reduced. The timer shall contain one instantaneous contact and one delayed contact. Time shall be adjustable from 1.5 to 60 minutes. The timer is factory set to hold the fans on for five (5) minutes after a drop in temperature below set point occurs but can be adjusted. The panel is factory pre-wired to shut down supply fans in a fire condition (tie into fire suppression system by others and field wired by others). There is also a factory pre-wire option to turn the exhaust fans on in a fire condition. Provide a light and fan switch mounted on the face of the hood, pre-wired to the control panel.

3) Entire ventilator canopy shall be constructed of a minimum of 18-gauge type #201 high grade, corrosive resistant, non-magnetic stainless steel on all surfaces. All exterior joints and seams shall be continuously welded liquid tight, ground smooth, and polished to the original finish. Construction to conform to NFPA 96 standards and shall meet UL 710 standards for operation. Ventilator canopy is constructed using the standing seam method for optimum strength. Construction shall be dependent on structural application to minimize distortion and other defects. All seams, joints, and penetrations of the hood enclosure to the lower outermost perimeter that directs and captures grease laden vapor and exhaust gases shall have a liquid tight continuous external weld in accordance with the current NFPA regulations. The interior capture area includes an aerodynamic arch to utilize convective heat to feed cooking effluents to the front mounted exhaust chamber. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. The hood shall have a double wall insulated front. Provide a concealed, full-length built in grease trough, accessible from the top for cleaning, with (1) removable grease cup in each ventilator section. Grease cup to include weep hole to indicate capacity of cup. Provide U.L. Classified stainless steel scoop-style extraction filters, installed at not less than a 45 angle, running full length behind canopy. Cartridges to be made of the same material, gauge, and type, as the hood itself.
4) Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation.
5) UL vapor proof round LED light fixtures shall be installed and pre-wired to a junction box and face mounted switch. The lamps are mounted no more than 30" on center.
6) MCP-3-E, motor control panel with switch will operate and interlock two (2) exhaust fans. Verify fan electrical and HP with submittal drawings.
7) The hoods are to include a pre-piping for Ansul R102 system. Components include black iron piping, quick seals, stainless sleeved drops, nozzles with blowoff cap, detector conduit, and detector brackets. All other Ansul components are provided by an authorized fire suppression contractor as part of the Food Service contractor's scope of work.
8) Exhaust fans are to be coordinated with the CFM requirements of the hood.

9) Note: Exhaust and supply fans are to be provided and installed by a separate contractor and are to be coordinated with the CFM and power requirements of the unit.
10) The hood shall be both UL and NSF rated per the most current codes and regulations.
11) F.S.E.C. is responsible for verifying and coordinating the exhaust duct riser location with the ceiling joists and all other site conditions.

B. ITEM: HS - 03
1. QUANTITY: 1
2. MANUFACTURER: ANSUL OR EQUAL
3. MODEL: R102
4. DESCRIPTION: FIRE SUPRESSION SYSTEM
a. The Fire suppression system is to be mounted in a stainless-steel cabinet on the wall was shown. Manual activation, along with means for simultaneous automatic shutting down of protected cooking equipment upon activation of said system to be included. System should be designed to provide plenum and duct collar protection. All exposed piping to be stainless steel plated. The manufacturer shall build a fusible link detection system into ventilator sections. All exposed fusible links are to be recessed into the top of the hoods with no visible conduit. Provision shall be made for manual actuation by readily accessible and plainly marked remote manual release station in each cooking area, located no less than 54" and no more than 78" above floor. Pull station will be surface mounted and conduit for system shall be concealed in the ceiling as much as possible. The system is to be sized in accordance with most current UL Standards. The system shall be furnished and installed by an authorized distributor in the field in accordance with manufacturer's instructions and in accordance with UL listings and shall conform to current NFPA and local and/or state codes and standards. This shall include mounting of system units, remote manual releases, nozzles, actuating devices, and running of all pipe and control tubing appurtenant to systems. The system should shut down the make-up air system, if applicable, in case of activation but allow the exhaust fan to keep operating.
b. The unit shall be stored pressure type, of sufficient capacity as determined by published standards to provide high concentration of liquid agent in plenum areas and duct collars. Liquid agents be stored in containers equipped with pressure gauges to verify operational readiness. Nozzles located in plenum and ductwork shall be capable of functioning with heavy accumulation of grease.
c. The gas shut-off valve shall be furnished by the F.S.E.C. and the size verified by the plumbing engineer. The F.S.E.C. is responsible for coordinating installation with all trades.

d. Micro-switches for electrical equipment shut off and/or actuation of fire alarm system shall be furnished as part of the fire protection system by the manufacturer and connected to the shunt trip provided and installed by the Electrical Contractor. The Electrical Contractor is to furnish and install a control relay to detect the operation of the system by connection to the Micro switches supplied by the Fire Protection System Contractor. The Electrical Contractor is to interface with the building alarm system and/or the fire command station and the micro switches as specified as well as interconnections between system and UDS system.

e. All access openings, holes, sleeves, chases, etc. in the building structure necessary to permit piping and control tubing to be run between system units, ventilator, and ductwork are to be provided by the General Contractor.

f. Provision shall be made to shut off the gas and electric supply to all cooking equipment upon actuation of the system.

C. ITEM: HS - 04

1. QUANTITY: 1
2. MANUFACTURER: BLODGETT
3. MODEL: ZEPH-100-G DBL
4. DESCRIPTION: DOUBLE CONVECTION OVEN
   a. Convection Oven, gas, double-deck, standard depth, five (5) 18” x 26” pans per compartment, two speed fan with solid state infinite controls, porcelain interior liner with coved corners, five (5) chrome plated racks and eleven (11) positions, porcelain crumb tray, two interior lights, stainless steel front, sides and top, simultaneous operated glass doors with removable interior glass windows, flue connector, 100,000 , ETL and NSF listed.
      1) 120/60/1
      2) Energy Star
      3) Solid state infinite control with 60-minute timer
      4) Manifold gas line to single connection
      5) 6” Stainless steel legs
      6) Two-year limited parts and labor warranty
      7) Three-year door warranty
   b. (1) T&S Brass Model #HG-4D-36SK, Safe-T-Link Gas Connector Kit, ¾” connection, 36" hose length, stainless steel braiding with extruded coating, one (1) Quick-Disconnect, two (2) Swivelink fittings, one (1) 90° elbow, ball valve, restraining cable adjustable for 3' to 5', 220,000 per hour minimum flow capacity.

D. ITEM: HS - 05

1. QUANTITY: 1
2. MANUFACTURER: BLODGETT
3. MODEL: ZEPH-100-G DBL

4. DESCRIPTION: DOUBLE CONVECTION OVEN
    a. Relocate the existing double convection as shown on the plans.
    b. (1) T&S Brass Model #HG-4D-36SK, Safe-T-Link Gas Connector Kit, ¾" connection, 36" hose length, stainless steel braiding with extruded coating, one (1) Quick-Disconnect, two (2) Swivelink fittings, one (1) 90° elbow, ball valve, restraining cable adjustable for 3' to 5', 220,000 per hour minimum flow capacity.

E. ITEM: HS - 06
1. QUANTITY: 1
2. MANUFACTURER: VULCAN MODEL: V4B36S
3. DESCRIPTION: RANGE
    a. V Series Heavy Duty Range, gas, 36", four (4) 35,000 open burners with lift-off burner heads, cast iron grates, individual pilots and controls for each burner, standard oven, stainless steel front, front top ledge, sides, base, burner box, stub back, stainless steel crumb tray, 6" adjustable legs, 190,000 , and NSF listed.
        1) Natural gas
        2) 1 ¼" rear gas connection with cap and cover on both ends
        3) 3/4" pressure regulator with reducer from 1 ¼" to ¾"
        4) Single-deck height riser with removable shelf
        5) Extra oven rack
        6) One-year parts and labor warranty
    b. K-12 School extended warranty extends the warranty for one year beyond the original one-year warranty.
    c. (1) T&S Brass Model #HG-4D-36SK, Safe-T-Link Gas Connector Kit, ¾" connection, 36" hose length, stainless steel braiding with extruded coating, one (1) Quick-Disconnect, two (2) Swivelink fittings, one (1) 90° elbow, ball valve, restraining cable adjustable for 3' to 5', 220,000 per hour minimum flow capacity.

F. ITEM: HS - 07
1. QUANTITY: 1
2. MANUFACTURER: CONVOTHERM
3. MODEL: C4 ET 6.20GB-N ON 6.20GB-N DD STACK
4. DESCRIPTION: DOUBLE COMBINATION OVEN

a. Maxx Pro Combi Oven/Steamer, gas, steam generator, includes two (6) 18" x 26" full size sheet pan or (12) 12" x 20" x 1" hotel pan capacity ovens, (12) 21" x 23" wire shelves and (12) 12" x 20, 10" Wi-Fi ready Easy-Touch control panel, US cookbook with 200 cooking recipes for common K-12 menu items, (4) cooking modes: hot air, steam, combi-steam and retherm, includes wire racks per oven, disappearing door, triple pane door with anti-microbial hygienic door handle, LED lights, pull-out spray hose, Convo-Clean+ fully automatic hands-free cleaning system, includes stacking kit with feet, stainless steel construction, and UL and NSF listed.
   1) (2) 120/60/1
   2) (2) Natural Gas - (2) @ 68,200 BTU
   3) (12) full size wire shelves
   4) (12) half size fry baskets
   5) Mobile Stacking Kit on 6" base
   6) Cleaner Kit, Includes: One (1) 2.5 Gallon container of Convo-Clean forte solution, one (1) 2.5 Gallon container of Convo-Care solution and a set of connectors and hoses
   7) Pre-installation site survey required
   8) Factory authorized installation and start-up top and bottom units.(2) Installation KitsProvide a water sample or recent water sample test results to the manufacturer for verification of the water filter system.Reverse Osmosis System with 50-Gallon Atmospheric Storage Tank, combines RO water and mineral addition, operates at line pressure to produce 375-gpd, storage tank has top-mounted variable-flow repressurization system and sub-micron air breather, includes integrated pre-filtration with particulate and chlorine reduction, hose, tubing and fittings required for installation.Factory authorized water filtration installation(1) Case Convo-CARE Solution Rinse Agent, (2) 2.5-gallon containers.(1) Case Convo-Clean Solution (Forte), (2) 2.5-gallon containers.Three-year parts and labor warranty
   9) (2) Installation KitsProvide a water sample or recent water sample test results to the manufacturer for verification of the water filter system.Reverse Osmosis System with 50-Gallon Atmospheric Storage Tank, combines RO water and mineral addition, operates at line pressure to produce 375-gpd, storage tank has top-mounted variable-flow repressurization system and sub-micron air breather, includes integrated pre-filtration with particulate and chlorine reduction, hose, tubing and fittings required for installation.Factory authorized water filtration installation(1) Case Convo-CARE Solution Rinse Agent, (2) 2.5-gallon containers.(1) Case Convo-Clean Solution (Forte), (2) 2.5-gallon containers.Three-year parts and labor warranty
   10) Provide a water sample or recent water sample test results to the manufacturer for verification of the water filter system.

11) Reverse Osmosis System with 50-Gallon Atmospheric Storage Tank, combines RO water and mineral addition, operates at line pressure to produce 375-gpd, storage tank has top-mounted variable-flow repressurization system and sub-micron air breather, includes integrated pre-filtration with particulate and chlorine reduction, hose, tubing and fittings required for installation.
12) Factory authorized water filtration installation
13) (1) Case Convo-CARE Solution Rinse Agent, (2) 2.5-gallon containers.
14) (1) Case Convo-Clean Solution (Forte), (2) 2.5-gallon containers.
15) Three-year parts and labor warranty

G. ITEM: HS - 08
1. QUANTITY: 1
2. MANUFACTURER: CONVOTHERM
3. MODEL: C4 ED 10.20 GB
4. DESCRIPTION: SINGLE COMBINATION OVEN
   a. Relocate the existing combination oven and stand as shown on the plans.
   b. (1) T&S Brass Model #HG-4C-36SK Safe-T-Link Gas Connector Kit, ½" connection, 36" hose length, stainless steel braiding with extruded coating, (1) Quick-Disconnect, two (2) Swivelink fittings, one (1) 90° elbow, ball valve, restraining cable adjustable for 3' to 5', 75,000 per hour minimum flow capacity.
   c. Relocate the existing RO Water System and Water filter as shown on the drawings and pipe over to the ovens as required.

H. ITEM: HS - 09
1. QUANTITY: 1
2. MANUFACTURER: VICTORY
3. MODEL: RS-2D-S1-HC
4. DESCRIPTION: REACH-IN REFRIGERATOR
5. Ultra-Spec Series Refrigerator, featuring Secure-Temp technology, double section, self-contained expansion-valve refrigeration, stainless steel exterior and interior with polyurethane foam insulation throughout, standard depth cabinet, full-height doors with locks and vertical handles, door hinges are selfclosing with a hold open feature, Super Cool mode, LED lighting, Touch Point electronic temperature control system, Energy saving mode, manager's lockout feature, clean condenser alarm, compressor protection alarm, and lift-up front shroud, UL and NSF listed.
   1) 120/60/1
   2) (2) Additional shelves
   3) 6" stainless steel legs
   4) Six-year parts and labor warranty
   5) Six-year compressor warranty

6) Two-year door gasket warranty

I. ITEM: HS - 10
1. QUANTITY: 1
2. MANUFACTURER: VICTORY
3. MODEL: RS-1D-S1-PT-HD-HC
4. DESCRIPTION: PASS-THRU REFRIGERATOR
   a. Ultra-Spec Series Refrigerator, featuring Secure-Temp technology, single section pass-thru, self-contained expansion-valve refrigeration, stainless steel exterior and interior with polyurethane foam insulation throughout, standard depth cabinet, half-height doors with lock and vertical handle, door hinges are selfclosing with a hold open feature, Super Cool mode, LED lighting, Touch Point electronic temperature control system, Energy saving mode, manager's lockout feature, clean condenser alarm, compressor protection alarm, and lift-up front shroud, UL and NSF listed.
      1) 120/60/1
      2) Full set of universal pan slides with 3" spacing
      3) Right hand hinged door on kitchen side
      4) Right hand hinged door on serving side
      5) Stainless steel legs
      6) Six-year parts and labor warranty
      7) Six-year compressor warranty
      8) Two-year door gasket warranty

J. ITEM: HS – 11
1. QUANTITY: 1
2. MANUFACTURER: VICTORY
3. MODEL: HS-1D-1-PT-HD-GD
4. DESCRIPTION: PASS-THRU HEATED CABINET
   a. The exiting Pass-Thru Heated Cabinet shall remain.

K. ITEM: HS - 12
1. QUANTITY: 2
2. MANUFACTURER: BEVERAGE AIR MODEL
3. MODEL: MMR38HC-1-B
4. DESCRIPTION: BEVERAGE REFRIGERATOR
   a. Market-Max Refrigerated Merchandiser, reach-in, two-section, 35.4 cubic foot capacity, (2) double pane self-closing sliding glass doors, automatic hold-open feature, electronic control, digital display, (10) epoxy coated wire shelves, LED interior lighting, lighted sign panel, bottom-mounted self-contained refrigeration, R290 Hydrocarbon refrigerant, epoxy coated evaporator coil, 1/3 HP, white interior, black exterior, UL and NSF listed.
      1) 120/60/1
      2) Stainless steel legs

3) Seven-year parts and labor warranty
4) Seven-year compressor warranty
5) Two-year door gasket warranty

4.2 **MIDDLE SCHOOL ITEMIZED SPECIFICATIONS ITEM:**

A. ITEM: MS-100
1. QUANTITY: 1
2. MANUFACTURER: AVTEC
3. MODEL: CH-168-60-3A-CHINOOK
4. DESCRIPTION: EXHAUST HOOD
a. Provide Avtec Exhaust Hood per detail drawings as shown on plans and in accordance with the following specifications and mounted at 80″ AFF to the bottom of the hood:
1) This series hood is a Type I, commercial kitchen, U.L. 710 listed ventilator canopy, approved for use over 400 and 600-° F equipment. Ventilator canopy shall be size, and shape as shown on drawing and shall be complete with, grease filters, grease trough, removable grease cup, and without a fire damper in exhaust duct. This non compensating exhaust only ventilator canopy is intended for use over light to heavy-duty types of cooking appliances. The hood shall have the size, shape, and performance specified in the contract documents. The hood section is approximately 14′ 0" x 6' 0" x 30″ high with (2) 10″ x 14″ exhaust collar exhausting a total of 3500 CFM. Exhaust duct collar to be fully welded 4" high with a 1" flange. The unit shall have a remote fire cabinet mounted on the wall as shown. Duct sizes and static pressure requirements are shown on the contract drawings. Make-Up Air plenum on the front of the hoods as shown.
2) System shall include an MCP-1 preview motor control panel. Panels should be wired to switches on the face of the front of the hood. This control panel is to accept single incoming service from building breaker panel for fans and be prewired to interlock, exhaust, and supply fans, and fire suppression interlock.

3) The electrical option is to be in the fire cabinet and is designed to thermostatically activate the exhaust fan for an exhaust hood, whenever elevated temperatures are sensed in the exhaust system. This option will meet the requirements of IMC 507.2.1.1 by providing a thermostat mounted in the capture area of the hood to sense increased exhaust temperatures. Controls shall be listed by ETL (((UL 508A))). The control enclosure shall be NEMA 1 rated and listed for installation inside of the exhaust hood utility cabinet. The control enclosure shall be constructed of stainless steel. Thermostat is in the hood capture area to be chrome plated to match the hood. The thermostat is factory set at an activation temperature of 110°F. Once the exhaust temperature reaches the set-point, then the normally open contacts will close, and the exhaust fan will be activated. The panel will also contain a timer to prevent cycling of the fan after the cooking appliances have been turned off and the heat in the exhaust system is reduced. The timer shall contain one instantaneous contact and one delayed contact. Time shall be adjustable from 1.5 to 60 minutes. The timer is factory set to hold the fans on for 15 minutes after a drop in temperature below set point occurs but can be adjusted. The panel is factory pre-wired to shut down supply fans in a fire condition. There is also a factory pre-wire option to turn on the exhaust fans in a fire condition. Provide a light and fan switch mounted on the face of the hood, wired to the control panel.

4) The exhaust ventilator is to have stainless steel filters mounted in the rear as shown in the drawings. Entire ventilator canopy shall be constructed of a minimum of 18-gauge type high grade, corrosive resistant, non-magnetic stainless steel on all surfaces. All exterior joints and seams shall be continuously welded liquid tight, ground smooth, and polished to the original finish. Construction to conform to NFPA 96 standards and shall meet UL 710 standards for operation. Ventilator canopy is constructed using the standing seam method for optimum strength. Construction shall be dependent on structural application to minimize distortion and other defects. All seams, joints, and penetrations of the hood enclosure to the lower outermost perimeter that directs and captures grease laden vapor and exhaust gases shall have a liquid tight continuous external weld in accordance with the current NFPA regulations. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. A built-in wiring chase provided for the electrical control face shall not penetrate the capture area. Grease trough is concealed within the ventilator and slopes to a removable grease cup located at the end of the ventilator canopy in the front for easy cleaning and disposal. LED light fixtures with bulbs shall be installed and pre-wired to a junction box and face mounted switch.
5) The wall backsplash panels are to be aesthetically pleasing and span between hood and floor and the length of the unit. Wall panels to be constructed with the same material, finish, and grain as the hood. Panels should go behind the hood a minimum of 2 inches to the floor behind the cove molding, and the hood should be sealed to the wall. FSEC is responsible for providing cut-outs in the stainless panels to accommodate any utilities coming out of the wall under the hood. Include divider bars and end trim for securing wall paneling to wall. Wall panels are to be included for rear walls, behind entire hood assembly including utility box and airspaces.
6) Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation. Exhaust fans are to be coordinated with the CFM requirements of the hood.
7) Exhaust fans are to be coordinated with the CFM requirements of the hood.
8) Note: Exhaust and supply fans are to be provided and installed by a separate contractor and are to be coordinated with the CFM and power requirements of the unit.
9) The hood shall be both UL and NSF rated per the most current codes and regulations.

10) FSEC is responsible for verifying and coordinating the exhaust duct riser location with the ceiling joists and all other site conditions.

B. ITEM: MS-101
1. QUANTITY: 1
2. MANUFACTURER: AVTEC
3. MODEL: CH-96-60-3A-CHINOOK
4. DESCRIPTION: EXHAUST HOOD
a. Provide Avtec Exhaust Hood per detail drawings as shown on plans and in accordance with the following specifications and mounted at 80″ AFF to the bottom of the hood:
1) This series hood is a Type I, commercial kitchen, U.L. 710 listed ventilator canopy, approved for use of over 400 and 600-° F equipment. Ventilator canopy shall be size, and shape as shown on drawing and shall be complete with grease filters, grease trough, removable grease cup, and without a fire damper in exhaust duct. This non compensating exhaust only ventilator canopy is intended for use over light to heavy-duty types of cooking appliances. The hood shall have the size, shape, and performance specified in the contract documents. The hood section is approximately 7′ 9" x 6' 0" x 30″ high with (1) 10″ x 16″ exhaust collar exhausting a total of 3938 CFM. Exhaust duct collar to be fully welded 4" high with a 1" flange. The unit shall have a remote fire cabinet mounted on the wall as shown. Duct sizes and static pressure requirements are shown on the contract drawings. Make-Up Air plenum on the front of the hoods as shown.
2) System shall include an MCP-1 preview motor control panel. Panels should be wired to switches on the face of the front of the hood. This control panel is to accept single incoming service from building breaker panel for fans and be prewired to interlock, exhaust, and supply fans, and fire suppression interlock.

3) The electrical option is to be in the fire cabinet and is designed to thermostatically activate the exhaust fan for an exhaust hood, whenever elevated temperatures are sensed in the exhaust system. This option will meet the requirements of IMC 507.2.1.1 by providing a thermostat mounted in the capture area of the hood to sense increased exhaust temperatures. Controls shall be listed by ETL (((UL 508A))). The control enclosure shall be NEMA 1 rated and listed for installation inside of the exhaust hood utility cabinet. The control enclosure shall be constructed of stainless steel. Thermostat is in the hood capture area to be chrome plated to match the hood. The thermostat is factory set at an activation temperature of 110°F. Once the exhaust temperature reaches the set-point, then the normally open contacts will close, and the exhaust fan will be activated. The panel will also contain a timer to prevent cycling of the fan after the cooking appliances have been turned off and the heat in the exhaust system is reduced. The timer shall contain one instantaneous contact and one delayed contact. Time shall be adjustable from 1.5 to 60 minutes. The timer is factory set to hold the fans on for 15 minutes after a drop in temperature below set point occurs but can be adjusted. The panel is factory pre-wired to shut down supply fans in a fire condition. There is also a factory pre-wire option to turn on the exhaust fans in a fire condition. Provide a light and fan switch mounted on the face of the hood, wired to the control panel.

4) The exhaust ventilator is to have stainless steel filters mounted in the rear as shown in the drawings. Entire ventilator canopy shall be constructed of a minimum of 18-gauge type high grade, corrosive resistant, non-magnetic stainless steel on all surfaces. All exterior joints and seams shall be continuously welded liquid tight, ground smooth, and polished to the original finish. Construction to conform to NFPA 96 standards and shall meet UL 710 standards for operation. Ventilator canopy is constructed using the standing seam method for optimum strength. Construction shall be dependent on structural applications to minimize distortion and other defects. All seams, joints, and penetrations of the hood enclosure to the lower outermost perimeter that directs and captures grease laden vapor and exhaust gases shall have a liquid tight continuous external weld in accordance with the current NFPA regulations. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. A built-in wiring chase provided for the electrical control face shall not penetrate the capture area. Grease trough is concealed within the ventilator and slopes to a removable grease cup located at the end of the ventilator canopy in the front for easy cleaning and disposal. LED light fixtures with bulbs shall be installed and pre-wired to a junction box and face mounted switch.
5) The wall backsplash panels are to be aesthetically pleasing and span between hood and floor and the length of the unit. Wall panels to be constructed with the same material, finish, and grain as the hood. Panels should go behind the hood a minimum of 2 inches to the floor behind the cove molding, and the hood should be sealed to the wall. FSEC is responsible for providing cut-outs in the stainless panels to accommodate any utilities coming out of the wall under the hood. Include divider bars and end trim for securing wall paneling to wall. Wall panels are to be included for rear walls, behind entire hood assembly including utility box and airspaces.
6) Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation. Exhaust fans are to be coordinated with the CFM requirements of the hood.
7) Exhaust fans are to be coordinated with the CFM requirements of the hood.
8) Note: Exhaust and supply fans are to be provided and installed by a separate contractor and are to be coordinated with the CFM and power requirements of the unit.
9) The hood shall be both UL and NSF rated per the most current codes and regulations.

10) FSEC is responsible for verifying and coordinating the exhaust duct riser location with the ceiling joists and all other site conditions.

C. ITEM: MS-102
1. QUANTITY: 1
2. MANUFACTURER: AVTEC
3. MODEL: CH-60-60-3A-CHINOOK
4. DESCRIPTION: EXHAUST HOOD
a. Provide Avtec Exhaust Hood per detail drawings as shown on plans and in accordance with the following specifications and mounted at 80″ AFF to the bottom of the hood:
1) This series hood is a Type I, commercial kitchen, U.L. 710 listed ventilator canopy, approved for use of over 400 and 600-° F equipment. Ventilator canopy shall be size, and shape as shown on drawing and shall be complete with grease filters, grease trough, removable grease cup, and without a fire damper in exhaust duct. This non compensating exhaust only ventilator canopy is intended for use over light to heavy-duty types of cooking appliances. The hood shall have the size, shape, and performance specified in the contract documents. The hood section is approximately 5′ 0" x 5' 0" x 30″ high with (1) 10″ x 10″ exhaust collar exhausting a total of 1250 CFM. Exhaust duct collar to be fully welded 4" high with a 1" flange. The unit shall have a remote fire cabinet mounted on the wall as shown. Duct sizes and static pressure requirements are shown on the contract drawings. Make-Up Air plenum on the front of the hoods as shown.
2) System shall include an MCP-1 preview motor control panel. Panels should be wired to switches on the suspending from overhead structure. A built-in wiring chase provided for the electrical control face shall not penetrate the capture area. Grease trough is concealed within the ventilator and slopes to a removable grease cup located at the end of the ventilator canopy in the front for easy cleaning and disposal. LED light fixtures with bulbs shall be installed and pre-wired to a junction box and face mounted switch.

3) The electrical option is to be in the fire cabinet and is designed to thermostatically activate the exhaust fan for an exhaust hood, whenever elevated temperatures are sensed in the exhaust system. This option will meet the requirements of IMC 507.2.1.1 by providing a thermostat mounted in the capture area of the hood to sense increased exhaust temperatures. Controls shall be listed by ETL (((UL 508A))). The control enclosure shall be NEMA 1 rated and listed for installation inside of the exhaust hood utility cabinet. The control enclosure shall be constructed of stainless steel. Thermostat is in the hood capture area to be chrome plated to match the hood. The thermostat is factory set at an activation temperature of 110°F. Once the exhaust temperature reaches the set-point, then the normally open contacts will close, and the exhaust fan will be activated. The panel will also contain a timer to prevent cycling of the fan after the cooking appliances have been turned off and the heat in the exhaust system is reduced. The timer shall contain one instantaneous contact and one delayed contact. Time shall be adjustable from 1.5 to 60 minutes. The timer is factory set to hold the fans on for 15 minutes after a drop in temperature below set point occurs but can be adjusted. The panel is factory pre-wired to shut down supply fans in a fire condition. There is also a factory pre-wire option to turn on the exhaust fans in a fire condition. Provide a light and fan switch mounted on the face of the hood, wired to the control panel.

4) The exhaust ventilator is to have stainless steel filters mounted in the rear as shown in the drawings. Entire ventilator canopy shall be constructed of a minimum of 18-gauge type high grade, corrosive resistant, non-magnetic stainless steel on all surfaces. All exterior joints and seams shall be continuously welded liquid tight, ground smooth, and polished to the original finish. Construction to conform to NFPA 96 standards and shall meet UL 710 standards for operation. Ventilator canopy is constructed using the standing seam method for optimum strength. Construction shall be dependent on structural application to minimize distortion and other defects. All seams, joints, and penetrations of the hood enclosure to the lower outermost perimeter that directs and captures grease laden vapor and exhaust gases shall have a liquid tight continuous external weld in accordance with the current NFPA regulations. The ventilator is to be equipped with necessary hanger brackets welded in place by the manufacturer at front and rear for suspending from overhead structure. A built-in wiring chase provided for the electrical control face shall not penetrate the capture area. Grease trough is concealed within the ventilator and slopes to a removable grease cup located at the end of the ventilator canopy in the front for easy cleaning and disposal. LED light fixtures with bulbs shall be installed and pre-wired to a junction box and face mounted switch.
5) The wall backsplash panels are to be aesthetically pleasing and span between hood and floor and the length of the unit. Wall panels to be constructed with the same material, finish, and grain as the hood. Panels should go behind the hood a minimum of 2 inches to the floor behind the cove molding, and the hood should be sealed to the wall. FSEC is responsible for providing cut-outs in the stainless panels to accommodate any utilities coming out of the wall under the hood. Include divider bars and end trim for securing wall paneling to wall. Wall panels are to be included for rear walls, behind entire hood assembly including utility box and airspaces.
6) Provide closure panels constructed with the same material as the hood to close off space between the top of hood and ceiling as required for field installation. Exhaust fans are to be coordinated with the CFM requirements of the hood.
7) Exhaust fans are to be coordinated with the CFM requirements of the hood.
8) Note: Exhaust and supply fans are to be provided and installed by a separate contractor and are to be coordinated with the CFM and power requirements of the unit.

b. The hood shall be both UL and NSF rated per the most current codes and regulations.

1) FSEC is responsible for verifying and coordinating the exhaust duct riser location with the ceiling joists and all other site conditions.

D. ITEM: MS-103
1. QUANTITY: 1
2. MANUFACTURER: CONVOTHERM
3. MODEL: C4 ET 6.20GB-N ON 6.20GB-N DD STACK
4. DESCRIPTION: DOUBLE COMBINATION OVEN
a. Maxx Pro Combi Oven/Steamer, gas, steam generator, includes two (6) 18" x 26" full size sheet pan or (12) 12" x 20" x 1" hotel pan capacity ovens, (12) 21" x 23" wire shelves and (12) 12" x 20, 10" Wi-Fi ready Easy-Touch control panel, US cookbook with 200 cooking recipes for common K-12 menu items, (4) cooking modes: hot air, steam, combi-steam and retherm, includes wire racks per oven, disappearing door, triple pane door with anti-microbial hygienic door handle, LED lights, pull-out spray hose, Convo-Clean+ fully automatic hands-free cleaning system, includes stacking kit with feet, stainless steel construction, and UL and NSF listed.
1) (2) 120/60/1
2) (2) Gas Powered - (2) @ 68,200
3) (12) full size wire shelves
4) (12) half size fry baskets
5) Mobile Stacking Kit on 6" base
6) Cleaner Kit, Includes: One (1) 2.5 Gallon container of Convo-Clean forte solution, one (1) 2.5 Gallon container of Convo-Care solution and a set of connectors and hoses
7) Pre-installation site survey required
8) Factory authorized installation and start-up top and bottom units.
9) (2) Installation Kits
10) Provide a water sample or recent water sample test results to the manufacturer for verification of the water filter system.
11) Reverse Osmosis System with 50-Gallon Atmospheric Storage Tank, combines RO water and mineral addition, operates at line pressure to produce 375-gpd, storage tank has top-mounted variable-flow repressurization system and sub-micron air breather, includes integrated pre-filtration with particulate and chlorine reduction, hose, tubing and fittings required for installation.
12) Factory authorized water filtration installation
13) (1) Case Convo-CARE Solution Rinse Agent, (2) 2.5-gallon containers.
14) (1) Case Convo-Clean Solution (Forte), (2) 2.5-gallon containers.
15) Three-year parts and labor warranty

E. ITEM: MS-104
1. QUANTITY: 2

2. MANUFACTURER: BLODGETT
3. MODEL: DFG-100-ES DBL
4. DESCRIPTION: DOUBLE CONVECTION OVEN
    a. Convection Oven, gas, double-deck, standard depth, five (5) 18" x 26" pans per compartment, two (2) speed fan, porcelain interior liner with coved corners, EZ slide rack with four chrome plated racks and eleven positions, porcelain crumb tray, interior lights, stainless steel front, sides and top, simultaneous operated glass doors with removable interior glass windows, flue connector, 90,000 , and ETL and NSF listed.
        1) (2) 120/60/1
        2) Gas Powered
        3) Energy Star
        4) Gas manifold to provide single point gas connection
        5) Solid State digital control with Cook and hold feature
        6) Draft diverter for under a hood application
        7) Stainless steel legs
        8) Three-year parts, two-year labor warranty and five additional year door warranty on parts only
        9) (1) T&S Brass Model #HG-4D-36SK, Safe-T-Link Gas Connector Kit, ¾" connection, 36" hose length, stainless steel braiding with extruded coating, one (1) Quick-Disconnect, two (2) Swivelink fittings, one (1) 90° elbow, ball valve, restraining cable adjustable for 3' to 5', 220,000 per hour minimum flow capacity.

F. ITEM: MS-105
1. QUANTITY: 1
2. MANUFACTURER: VULCAN
3. MODEL: K60GLT
4. DESCRIPTION: KETTLE
    a. Tilting Kettle, Gas powered, 60-gallon working capacity, water resistant controls, self-locking tilt mechanism, manual crank tilt, 2/3 jacketed, embossed gallon markings, 316 series stainless steel liner, heavy duty bar rim, ellipsoidal bottom, faucet bracket on tilting console, stainless steel construction, tri-leg base with flanged feet, 100,000 , and NSF listed.
        1) 120/60/1
        2) Natural Gas Powered
        3) 2" Tangent draw-off
        4) Perforated Disk Strainer with 1/8" holes and Solid Disk Strainer
        5) 2" Brush Set, includes kettle brush, drain valve brush, and paddle
        6) Spring assisted stainless steel hinged cover kit
        7) Pan Carrier
        8) Double pantry faucet with swing spout and mounting bracket
        9) Flanged Feet

10) One-year parts and labor warranty
11) T&S Brass Model #HG-4D-36SK Safe-T-Link Gas Connector Kit, ¾" connection, 36" hose length, stainless steel braiding with extruded coating, one (1) Quick-Disconnect, two (2) Swivelink fittings, one (1) 90° elbow, ball valve, restraining cable adjustable for 3' to 5', 220,000 per hour minimum flow capacity.
12) T&S Brass Model #B-0176-ER Single hole deck mount mixing faucet, quarter-turn Eterna cartridges with spring check valve, lever handles, 60" flexible stainless-steel hose, 1.15 GPM Spray valve, Add on-faucet with 18" swing nozzle, 90-degree swivel adapter arm with vacuum breaker, and flexible stainless steel supply hoses with ½" male inlets.

G. ITEM: MS-106
1. QUANTITY: 1
2. MANUFACTURER: VULCAN
3. MODEL: VGLT60
4. DESCRIPTION: KETTLE
   a. Relocate the existing kettle as shown on the plans.
   b. T&S Brass Model #HG-4D-36SK Safe-T-Link Gas Connector Kit, ¾" connection, 36" hose length, stainless steel braiding with extruded coating, one (1) Quick-Disconnect, two (2) Swivelink fittings, one (1) 90° elbow, ball valve, restraining cable adjustable for 3' to 5', 220,000 per hour minimum flow capacity. Very gas hose connection with existing equipment.
   c. T&S Brass Model #B-0176-ER Single hole deck mount mixing faucet, quarter-turn Eterna cartridges with spring check valve, lever handles, 60" flexible stainless-steel hose, 1.15 GPM Spray valve, Add on-faucet with 18" swing nozzle, 90-degree swivel adapter arm with vacuum breaker, and flexible stainless steel supply hoses with ½" male inlets.

H. ITEM: MS-107
1. QUANTITY: 1
2. MANUFACTURER: VULCAN
3. MODEL: V4B36S
4. DESCRIPTION: RANGE
   a. V Series Heavy Duty Range, gas, 36", four (4) 35,000 open burners with lift-off burner heads, cast iron grates, individual pilots and controls for each burner, standard oven, stainless steel front, front top ledge, sides, base, burner box, stub back, stainless steel crumb tray, 6" adjustable legs, 190,000 , and NSF listed.
   b. Natural gas
   c. 1 ¼" rear gas connection with cap and cover on both ends
   d. 3/4" pressure regulator with reducer from 1 ¼" to ¾"
   e. Single-deck height riser removable shelf
   f. Extra oven rack

g. One-year parts and labor warranty
h. K-12 School extended warranty extends the warranty for one year beyond the original one-year warranty.
i. (1) T&S Brass Model #HG-4D-36SK, Safe-T-Link Gas Connector Kit, ¾" connection, 36" hose length, stainless steel braiding with extruded coating, one (1) Quick-Disconnect, two (2) Swivelink fittings, one (1) 90° elbow, ball valve, restraining cable adjustable for 3' to 5', 220,000 per hour minimum flow capacity.

I. ITEM: MS-108
1. QUANTITY: 1
2. MANUFACTURER: BALLY
3. MODEL: 49269-001-RO1-PH
4. DESCRIPTION: WALK-IN COOLER/FREEZER
a. General –The overall size of the walk-in box shall be approximately 27'4" x 11' 4 ½" x 8'6" Tall. The cooler and freezer compartment interior dimensions are as shown in the drawings. Verify size and shape as shown on the plan. Walk-ins shall be constructed of prefabricated modular panels as manufactured by Bally Refrigeration, Morehead City, NC. They shall be designed for easy and accurate field assembly, future enlargement by the addition of panels, or dismantling should relocation to an alternate site be desired. Construction shall be in strict compliance with NSF Standard 7 and UL. This unit shall be provided with internal ramps to create a smooth transition between the walk-in floor and the building floor.
b. Panel Construction - All panels shall consist of interior and exterior metal surfaces precision roll formed to exact dimensions with double 90° edges to enhance overall panel rigidity. The finished metal surfaces shall be fitted with a teardrop profile gasket and placed in precision-tooled fixtures where they are injected with Foamed-in-Place urethane insulation. Curing of the insulating core shall take place at a controlled temperature within the foaming fixture to provide permanent adhesion to the metal surfaces, to allow uniform foam expansion and to maximize finished panel strength. Panel edges shall have a molded urethane tongue and groove profile of insulation factor equal to core material to accurately align panels during installation and to assure an airtight seal. No structural wood, or other non-insulating materials shall be used in panel construction. Finished panels must be UL classified building units, and each should bear the Underwriters Laboratory label.
c. Finished panels will be 4" thick and will be provided in 11 ½", 23", 34 ½" and 46" widths to conform to project drawings. Corner panels shall be one piece 90° angled construction and shall measure 12" x 12" or 12" x 6 ¼" where required. All panels shall be interchangeable with like panels or standard doorframe sections for fast and easy assembly.

d. Floor Construction – Where prefabricated floor panels are required, they shall be like that of the vertical panels, but with a heavier-gauge interior skin and shall incorporate a: thickness of floor panels may be different than that of the vertical panels. The end floor panels will have extra cam-locks to accommodate various panel configurations. 4″ thick floor panels have 3/8″ inside coved radius built around the perimeter off skins and are NSF certified. Coved trim is available for 5″ and 6″ floors also allowing them to be NSF compliant. Floor panels shall be reinforced with ½″ grade plywood and shall be capable of supporting evenly distributed loads up to 1300 pounds per square foot or more. Floor to be: .125″ Aluminum tread plate. This unit is to be recessed into the building floor creating a smooth transition between the floor of the walk-in and the building floor.

e. Door Construction - Entrance doors are in-fitting and flush-mounted and conform to the same standards as vertical panels. Magnetic core, thermoplastic gaskets installed on the top edge and both sides of the door shall keep the door in a closed position, forming a tight seal; a flexible, dual blade wiper gasket shall be installed at the bottom of the door. NSF Certified gaskets shall be replaceable and resistant to damage from oil, fats, water, and detergent. A heavy U-channel structural steel frame around the perimeter of the door opening shall prevent racking or twisting; steel frame is to be reinforced for hardware attachment. Anti-condensate heater wire shall be concealed behind the metal edge of the doorjambs. The Door panel shall also include Vapor-proof LED interior lamp; junction box for 120/60/1 AC service (15 amp maximum); 2″-diameter flush-face dial thermometer (if alarm with digital readout is not provided) Provides dual temperature readings in a range from -60°F to 80°F.

f. The door hardware shall be die cast zinc with brushed satin finish. Doors shall be mounted with three (3) heavy-duty cam lift hinges. The pull handle assembly shall incorporate a keyed cylinder lock and an inside safety release handle to prevent personnel entrapment. A hydraulic closer device shall assist positive door closing and sealing.

g. Walk-In Monitoring System Modularm 75LC: System to have an easy-to-read LCD display with high and low alarm set points with audible and visual alerts for alarm conditions. The system shall include Auto set Technology for automatic set point control. The system should have an integrated, push-button light switch with on/off indicator light. The system shall comply with the latest federal energy requirements by incorporating an automatic lighting shut off. The system shall be supplied with dry contacts for connection to equipment that requires dry contacts such as building monitoring systems, dialers, etc. A magnetic contact, MC-1, shall be installed on the door for auto light feature and door "open" monitoring. The system to be supplied interior press button light switch and panic alarm with constant burning backlight, IP-1. The system should include a Motion detector, MD-1, to reset the light timer when motion is present. Both digital displays should be in the exterior entrance door panel frame when one or more doors are on a partition wall.

h. Exterior entrance doors, 36" x 77" (swing as shown on drawing) to include:
   1) Door and frame to be Embossed stainless steel
   2) Door Closer
   3) Door Kick plate, 1/10" aluminum tread plate, 36" High on interior and exterior of each door
   4) Cam lift hinges (3)
   5) Padlock handle with inside safety release
   6) Magnetic gasket
   7) Single Sweep gasket
   8) Switch with pilot light
   9) 14"x 14" Vision Window, heated
   10) Motion censored lights
   11) Panic Button

i. Finishes - The interior and exterior finish on all panel surfaces may be manufactured from any combination of the following premium grade aluminum or steel materials. The gauge or thickness of the metal material listed is rated prior to embossing.
   1) Exposed Exterior walls: Embossed white.
   2) Interior walls and interior ceilings: White stucco aluminum
   3) Un-exposed exterior: Embossed galvalume

j. Insulation - Insulation shall be 4" thick non-ozone depleting urethane, be foamed in place, and when completely heat cured, shall bind tenaciously to the metal skins to form an insulated panel. Panels and doors must meet or exceed minimum R-Values for cooler (R-25) and Freezer (R-32) when tested per ASTM C518 per Federal Regulation 431.304. HFC expanding agents shall be used to create a greater than 90% closed cell structure/ Panels shall generate a flame spread of 25 or lower and smoke generation of 450 or lower when tested in accordance with ASTM E84 for UL. Foam used shall be Factory Mutual listed.

k. Panel Assembly - Panels shall be equipped with Bally Speed-Lok diaphragmatic joining devices. Each Speed-Lok shall consist of a cam action, hooked locking arm placed in one panel, and a steel rod positioned in the adjoining panel, so that when the arm is rotated, the hook engages the rod and draws the panels tightly together with cam action. Arms and rods shall be housed in individual steel pockets. Pockets on one side of the panel shall be connected to pockets on the other side in width, using 2" wide metal straps set into and surrounded by the insulation. The distance between Speed-Locks shall not exceed 46". When panels are joined together, these straps shall form lock-to-lock connections for extra strength. All access ports shall be located on the walk-in interior to facilitate assembly when close to building structures and shall be covered by vinyl snap-in caps after final assembly. Complete step-by-step assembly instructions, and erection drawings shall be supplied by the manufacturer.

l. Walk-In Accessories for each compartment:
    1) (1) LED 48" Light fixture in the cooler compartment, high output, for low temperature applications in coolers.
    2) (2) LED 48" Light fixture in the freezer compartment, high output, for low temperature applications in freezers.
    3) LED Vapor-proof light in each door frame
    4) (2) Power air curtain with backing on exterior of cooler: Berner Model #SLC-07-1036A-SS complete with cord and plug for receptacle built into the door panel.
    5) Exposed exterior to have two-tier bumper rails mounted at 12" AFF and 36" AFF.
    6) Exterior corners of building walls to be sealed with full-height stainless steel closure strips.
    7) Provide stainless steel closure panels between walk-in and ceiling.
    8) Provide a vapor barrier between the concrete slab and the walk-in-floor panels. (Typically, a 6-mil polyethylene sheet or a 15-pound asphalt paper with a 4" overlap at all seams). Verify with manufacturers installation instructions. Provide documentation and photos as proof of installation.
    9) Heated pressure relief port on freezer sections

m. Warranty - Insulated panel products are to be warranted for a period of ten (10) years after the date of installation for the original user should the panels be installed properly and be used under normal service conditions. After an inspection authorized by the manufacturer, should any part of the product prove to be defective in material or workmanship, it will be repaired or replaced free of charge, F.O.B. factory. This warranty does not apply to accessories or components supplied but manufactured by other companies who furnish their own warranties.

n. K.E.C. shall provide an installation workmanship warranty of three (3) years from the date of installation.

o. All refrigeration equipment shall comply with the Federal Regulations for energy efficiency. Walk-In coolers or freezers need to include the following: automatic door closing device, strip curtains on hinged doors, heated triple pane windows on cooler and freezer doors, high efficiency lighting or automatic light switches, R-25 insulation in cooler walls, doors, and ceilings, R-32 insulation in freezer walls, doors, and ceilings, and R-28 insulation in walk-in cooler and freezer floors.

p. Prior to turning on refrigeration systems, K.E.C. to "test" the walk-in boxes to verify they are air tight. A smoke test, flood light test, or other means of similar testing is required. If an air-tight test is not performed, the K.E.C. will provide a letter of workmanship warranty for a period of five (5) years covering any defects or air leaks in the walk-in unit.

J. ITEM: MS–109 & MS-110

1. QUANTITY: 1
2. MANUFACTURER: REFRIGERATION DESIGN TECHNOLOGIES
3. MODEL: PCM009ZCT3A / BEL0095
4. DESCRIPTION: WALK-IN COOLER REFRIGERATION

a. Walk-In cooler will be provided with a condensing unit and evaporator for refrigerated equipment in accordance with ASHRAE standards. All systems shall be supplied with complete controls for a working system. Each system shall consist of a new condensing unit suspended on a structural steel base with cover and winter controls.

b. Condensing units shall be accessible preassembled remote, scroll type, air-cooled units for outdoor installation with matching evaporator. Condensing units shall be equipped with PSC fan motors and evaporator fans shall utilize the ECM type fan motors. All refrigeration equipment shall comply with the Federal Regulations for energy efficiency. Refrigeration systems are to be located on the roof of the building. Curb and wind restraints are to be provided and installed by others. Coordinate location with Architect and General Contractor.

c. Medium temperature unit shall utilize R-448a refrigerant. The manufacturer calculates heat loads and provides systems with a minimum of 105% of needed capacity to maintain holding temperature 35° F in coolers. Calculations shall take into consideration box ambient, refrigeration system ambient, airflow, and exposure to sunlight and altitude. Interconnection of refrigeration lines, insulation, and electrical wiring shall be accomplished by the appropriate trades and shall be a portion of the Kitchen Equipment Contract.

d. The refrigeration system on the walk-in will be equipped with the RDT Eco-Smart on-demand de-frost controller factory mounted to the evaporator coil(s). The Eco-Smart will be custom designed for RDT refrigeration systems to control the electric expansion valve in response to true evaporator superheat and return air temperature. Power wiring for the evaporator coils will be provided by the E.C. as required. Off cycle and electric defrost is also available. Provide heaters as required so product does not freeze.

e. Additionally, a refrigeration system containing an Eco-Smart controller will consist of the following factory-mounted parts:
   1) Electronic controller board with three digit LED and push button panel interface for setup
   2) Three solid state temperature sensors
   3) Pressure transducer
   4) External relay to control liquid line solenoid valve or compressor contactor
   5) Electric expansion valve
   6) 24V transformer

f. The Eco-Smart board will contain three relay outputs: defrost heater (20A), evaporator fan (10A) and alarm (5A). The board will include connection points for alarm systems provided by others.

g. Medium temperature systems come with one preprogramed defrost per day if it needs to run in safe mode and to ensure oil returns to the compressor if no demand defrosts are required. All other defrosts are by demand which will be activated by the 3 factory mounted sensors on the evaporator coil.

5. COOLER CONDENSER:

a. Compressors shall be scroll type and shall operate on R-448A refrigerant. Multiple compressors shall be used to satisfy load requirements. Small loads shall be combined in a multiplex arrangement and satisfied using a single compressor. Each compressor unit shall also include dual pressure control, sight glass, liquid line drier and suction and discharge vibration eliminators. Provide one (1) PCM009ZCT3A Medium temperature, 35-degree Fahrenheit, pre-assembled remote, scroll outdoor remote refrigeration condenser (.90 H.P.) with voltage to be 208/3. Provide and install weather-proof stainless-steel housing, low ambient controls, and a mounting stand. Low pressure bypass and ambient safety accessories are to be provided on the outdoor condensing units to protect them under extreme outside temperatures of approximately -20 F.

6. COOLER EVAPORATOR:
   a. Evaporator Coils - Matching evaporators shall be provided as required to complete the system. Evaporators shall be provided with mounted expansion valve and room thermostat. Evaporators shall be provided with the Eco-Smart Controller System. Evaporators shall be off cycle, electric or reverse cycle defrost. Provide one (1) BEL0095 evaporator unit and voltage of 120/1. Low profile evaporator coil with expansion valve, thermostat, and solenoid factory mounted. Evaporators shall be forced air type designed for ceiling installation. Air discharge shall be parallel to the walk-in ceiling. Fan motors, guards, multi-fin, and tube-type coil shall be housed in heavy gauge aluminum housing. Unit shall have drain pan with suitable drainpipe connection. Defrost shall be initiated only when required by demand defrost settings and temperature terminated with built-in fail-safe control. All cooler systems are equipped with an "off cycle" timer to maximize heat transfer and maintain optimum energy efficiency. Evaporators shall be U.L. listed.
7. MONITORING:
   a. The system shall be provided with means to monitor the refrigeration systems via the SmartVap controller, which is an on-demand or adaptive control board.
      1) The system goes into defrost only when needed.
      2) Saves energy by adapting to the load and cooling required.
      3) Includes remote monitoring and communication capabilities.
         a) Ability to view and control system operation remotely.
         b) Remotely download temperature and alarm report history.
         c) Remotely view and change system parameters and alarm settings.
         d) Advanced alarm notification via text and/or e-mail for up to five recipients.

b. Both refrigeration systems are to be monitored, therefore provide Cate5e or Cat6 cable from the evaporators to a network switch (which requires 120v receptacle), and then to the Edge Manager (which requires 120v receptacle) for monitoring of multiple systems with a single IP address. Network coordination and owner IT department will be required for final operation and installation.

8. PIPING:
   a. All refrigeration piping will be performed by the Food Service Equipment Contractor. This Contractor will install all components and piping per the manufacturer's recommendations. The Food Service Equipment Contractor will perform all refrigeration piping. This Contractor will install all components and piping per the manufacturer's recommendations. Traps, piping hangers and supports, and all associated hardware shall be provided by this contractor.
   b. Line sizes must be appropriately sized for the length of run. If units have reverse-cycle defrost, liquid lines shall be upsized to one nominal size.
   c. FSEC will make all final connections to the evaporator and the condenser, charge and test the operation of the system.
   d. Copper drain lines with insulation are installed by the Food Service Equipment Contractor.
9. ELECTRICAL:
   a. Electrical Contractor is to provide final electrical connection to the condenser, evaporator, air curtain, and lights. Coordinate location with the General Contractor.
   b. Provide Cat5 or Cat 6 cable from the evaporator to the building internet network or Food Service director's office for monitoring of the refrigeration system, to be installed by the E.C.
10. WIRING:
   a. All interior wiring shall be "liquidtite" fittings and sealed to prevent water migration.
   b. The use of Romex, BX, and MC Cable is prohibited and should be deemed to not meet specifications.
   c. All control wiring and inter-wiring are to be done by the Food Service Equipment Contractor.
11. WARRANTY
   a. The successful bidder shall provide written warranties that specify, subject to normal and accepted use, at a minimum:
      1) Five Year Compressor Warranty
      2) Three Year Service / Workmanship Warranty on refrigeration installation.
      3) One Year Manufacturer's Warranty on all other components.

K. ITEM: MS–111 & MS-112

1. QUANTITY: 1
2. MANUFACTURER: REFRIGERATION DESIGN TECHNOLOGIES
3. MODEL: PCL055ZCT3A
4. DESCRIPTION: WALK-IN FREEZER REFRIGERATION
    a. Walk-In Freezer will be provided with a condensing unit and evaporator for refrigerated equipment in accordance with ASHRAE standards. All systems shall be supplied with complete controls for a working system. Each system shall consist of a new compressor unit mounted on a structural stainless-steel base with cover and winter controls.
    b. Condensing units shall be accessible preassembled remote, scroll type, air-cooled units for outdoor installation with matching evaporator. Condensing units shall be equipped with PSC fan motors and evaporator fans shall utilize the ECM type fan motors. All refrigeration equipment shall comply with the Federal Regulations for energy efficiency. Refrigeration systems are to be located on the roof of the building. Curb and wind restraints are to be provided and installed by others. Coordinate location with Architect and General Contractor.
    c. Low temperature unit shall utilize R-448a refrigerant. The manufacturer calculates heat loads and provides systems with a minimum of 105% of needed capacity to maintain holding temperature –10° F in freezers. Calculations shall take into consideration box ambient, refrigeration system ambient, airflow, and exposure to sunlight and altitude. Interconnection of refrigeration lines, insulation, and electrical wiring shall be accomplished by the appropriate trades and shall be a portion of the Kitchen Equipment Contract.
    d. The refrigeration system in the walk-in will be equipped with an on-demand defrost controller factory mounted to the evaporator coil(s). The controller will be custom designed for Omnitemp refrigeration systems to control the electric expansion valve in response to true evaporator superheat and return air temperature. Power wiring for the evaporator coils will be provided by the E.C. as required. Off cycle and electric defrost are also available.
    e. Additionally, a refrigeration system containing an on-demand controller will consist of the following factory-mounted parts:
        1) Electronic controller board with three digit LED and push button panel interface for setup
        2) Three solid state temperature sensors
        3) Pressure transducer
        4) External relay to control liquid line solenoid valve or compressor contactor
        5) Electric expansion valve
        6) 24V transformer

f. The Smart Controller board will contain three relay outputs: defrost heater (20A), evaporator fan (10A) and alarm (5A). The board will include connection points for alarm systems provided by others.

g. Low temperature systems come with two preprogramed defrost per day if it needs to run in safe mode and to ensure oil returns to the compressor if no demand defrosts are required. All other de-frosts are by demand which will be activated by the 3 factory mounted sensors on the evaporator coil.

h. The Smart Controller system will: Float the head pressure, reduce system refrigerant charge by a minimum of one third, and reduce the defrost time when hot gas is used to defrost the coil. Any proposed alternatives must perform the energy-saving functions of all three features.

5. FREEZER CONDENSER:

a. Compressors shall be hermetic/scroll type and shall operate on R-448A refrigerant. Multiple compressors shall be used to satisfy load requirements. Small loads shall be combined in a multiplex arrangement and satisfied using a single compressor. Each compressor unit shall also include dual pressure control, sight glass, liquid line drier and suction and discharge vibration eliminators. One (1) PCL055ZCT3A Low temperature, -10-degree Fahrenheit, pre-assembled remote, hermetic/scroll type outdoor remote refrigeration condenser (5.5 H.P.) and voltage to be 208/3. Low temperature units also are to include evaporator drain line heaters (by others). Low pressure bypass and ambient safety accessories are to be provided on the outdoor condensing units to protect them under extreme outside temperatures of approximately -20 F.

6. FREEZER EVAPORATOR:

a. Matching evaporators shall be provided as required to complete the system. Evaporators shall be provided with mounted expansion valve and room thermostat. Evaporators shall be provided with the On-Demand Defrost Control System. Evaporators shall be off cycle, electric or reverse cycle defrost. Provide one (1) BEL0155 evaporator unit with voltage of 208/1. Low profile evaporator coil with expansion valve, thermostat, and solenoid factory mounted. Evaporators shall be forced air type designed for ceiling installation. Air discharge shall be parallel to the walk-in ceiling. Fan motors, guards, multi-fin, and tube-type coil shall be housed in heavy gauge aluminum housing. Unit shall have drain pan with suitable drainpipe connection. Freezer evaporators shall utilize electric defrost and heated drain pan. Defrost shall be initiated only when required by demand defrost settings and temperature terminated with built-in fail-safe control. Evaporators shall be U.L. listed.

7. MONITORING:

a. The system shall be provided with means to monitor the refrigeration systems via the SmartVap controller, which is an on-demand or adaptive control board.

1) The system goes into defrost only when needed.
2) Saves energy by adapting to the load and cooling required.
3) Includes remote monitoring and communication capabilities.
    a) Ability to view and control system operation remotely.
    b) Remotely download temperature and alarm report history.
    c) Remotely view and change system parameters and alarm settings.
    d) Advanced alarm notification via text and/or e-mail for up to five recipients.

b. Both refrigeration systems are to be monitored (up to 35), therefore provide Cate5e or Cat6 cable from the evaporators to a network switch (which requires 120v receptacle), and then to the Edge Manager (which requires 120v receptacle) for monitoring of multiple systems with a single IP address. Network coordination and owner IT department will be required for final operation and installation.

8. PIPING:
    a. All refrigeration piping will be performed by the Food Service Equipment Contractor. This Contractor will install all components and piping per the manufacturer's recommendations. The Food Service Equipment Contractor will perform all refrigeration piping. This Contractor will install all components and piping per the manufacturer's recommendations. Traps, piping hangers and supports, and all associated hardware shall be provided by this contractor.
    b. Line sizes must be appropriately sized for the length of run. If units have reverse-cycle defrost, liquid lines shall be upsized to one nominal size.
    c. FSEC will make all final connections to the evaporator and the condenser, charge and test the operation of the system.
    d. Copper drain lines, heated and insulated, installed by the Food Service Equipment Contractor.
9. ELECTRICAL:
    a. Electrical Contractor is to provide final electrical connection to the condenser, evaporator, air curtain, and lights. Coordinate location with the General Contractor.
    b. Provide Cat5 or Cat 6 cable from the evaporator to the building internet network or Food Service director's office for monitoring of the refrigeration system, to be installed by the E.C.
10. WIRING:
    a. All interior wiring shall be "liquidtite" fittings and sealed to prevent water migration.
    b. The use of Romex, BX, and MC Cable is prohibited and should be deemed to not meet specifications.
    c. All control wiring and inter-wiring are to be done by the Food Service Equipment Contractor.

11. WARRANTY:
    a. The successful bidder shall provide written warranties that specify, subject to normal and accepted use, at a minimum:
        1) Five Year Compressor Warranty
        2) Three Year Service / Workmanship Warranty on refrigeration installation.
        3) One Year Manufacturer's Warranty on all other components.

L. ITEM: MS-113
1. QUANTITY: 6
2. MANUFACTURER: CAMBRO
3. MODEL: CP-VS4480 SERIES
4. DESCRIPTION: WALK-IN COOLER SHELVING
    a. (2) Cambro Model #CPU244272VS4480, Camshelving Premium Starter Unit, 24"deep x 42" long x 72" tall, 4-tier, withstands temperature -36°F to 190°F, includes: (3) vented and (1) solid polypropylene shelf plates with Camguard antimicrobial protection, (2) pre-assembled post kits, (8) traverses with molded-in dovetails, 800-pound capacity per shelf with a 2,000-pound maximum capacity, speckled gray, and NSF listed.
    b. (4) Cambro Model #CPA244872VS4480, Camshelving Premium Add-On Unit, 24"deep x 48" long x 72" tall, 4-tier, withstands temperature -36°F to 190°F, includes: (3) vented and (1) solid polypropylene shelf plates with Camguard antimicrobial protection, (1) pre-assembled post kits, (8) traverses with molded-in dovetails, 800-pound capacity per shelf with a 2,000-pound maximum capacity, speckled gray, and NSF listed.
    c. (6) Model #CPDS24H6480 Camshelving Premium Dunnage Support, 24" deep x 7 ½" tall, speckled gray, and NSF listed.
    d. Verify sizes with site conditions.

M. ITEM: MS-114
1. QUANTITY: 1
2. MANUFACTURER: CAMBRO
3. MODEL: DRS600480
4. DESCRIPTION: WALK-IN COOLER DUNNAGE RACK
    a. S-Series Dunnage Rack, 21" deep x 60" wide x 12" tall, slotted top, 3000-pound load capacity, polypropylene, one-piece, seamless double wall construction, includes (1) Camlink®, 4" square legs, speckled gray, NSF.
    b. Verify sizes with site conditions.

N. ITEM: MS-115
1. QUANTITY: 4
2. MANUFACTURER: CAMBRO
3. MODEL: CP-VS4480 SERIES
4. DESCRIPTION: WALK-IN FREEZER SHELVING

5. (1) Cambro Model #CPU245472VS4480, Camshelving Premium Starter Unit, 24"deep x 54" long x 72" tall, 4-tier, withstands temperature -36°F to 190°F, includes: (3) vented and (1) solid polypropylene shelf plates with Camguard antimicrobial protection, (2) pre-assembled post kits, (8) traverses with molded-in dovetails, 800-pound capacity per shelf with a 2,000-pound maximum capacity, speckled gray, and NSF listed.
    a. (3) Cambro Model #CPA244872VS4480, Camshelving Premium Add-On Unit, 24"deep x 48" long x 72" tall, 4-tier, withstands temperature -36°F to 190°F, includes: (3) vented and (1) solid polypropylene shelf plates with Camguard antimicrobial protection, (1) pre-assembled post kits, (8) traverses with molded-in dovetails, 800-pound capacity per shelf with a 2,000-pound maximum capacity, speckled gray, and NSF listed.
    b. (4) Model #CPDS24H6480 Camshelving Premium Dunnage Support, 24" deep x 7 ½" tall, speckled gray, and NSF listed.
    c. Verify sizes with site conditions.

O. ITEM: MS-116
1. QUANTITY: 1 LOT
2. MANUFACTURER: CAMBRO
3. MODEL: DRS-480 SERIES
4. DESCRIPTION: WALK-IN FREEZER DUNNAGE
    a. (3) Cambro Model #DRS480480 S-Series Dunnage Rack, 21" deep x 48" wide x 12" tall, slotted top, 3000-pound load capacity, polypropylene, one-piece, seamless double wall construction, includes (1) Camlink®, 4" square legs, speckled gray, NSF.
    b. (4) Cambro Model #DRS360480 S-Series Dunnage Rack, 21" deep x 36" wide x 12" tall, slotted top, 3000-pound load capacity, polypropylene, one-piece, seamless double wall construction, includes (1) Camlink®, 4" square legs, speckled gray, NSF.
    c. Verify sizes with site conditions.

P. ITEM: MS-117
1. QUANTITY: 1
2. MANUFACTURER: ANSUL OR EQUAL
3. MODEL: R102
4. DESCRIPTION: FIRE SUPPRESSION SYSTEM

a. The Fire suppression system is to be mounted in a stainless-steel cabinet on the wall was shown and coordinated with the site. Manual activation, along with means for simultaneous automatic shutting down of protected cooking equipment upon activation of said system to be included. System should be designed to provide plenum and duct collar protection for all three hoods. All exposed piping to be stainless steel plated. The manufacturer shall build a fusible link detection system into ventilator sections. All exposed fusible links are to be recessed into the top of the hoods with no visible conduit. Provision shall be made for manual actuation by readily accessible and plainly marked remote manual release station in each cooking area, located no less than 54" and no more than 78" above floor. Pull station will be surface mounted and conduit for system shall be concealed in the ceiling as much as possible. The system is to be sized in accordance with most current UL Standards. The system shall be furnished and installed by an authorized distributor in the field in accordance with manufacturer's instructions and in accordance with UL listings and shall conform to current NFPA and local and/or state codes and standards. This shall include mounting of system units, remote manual releases, nozzles, actuating devices, and running of all pipe and control tubing appurtenant to systems. The system should shut down the make-up air system, if applicable, in case of activation but allow the exhaust fan to keep operating.

b. The unit shall be stored pressure type, of sufficient capacity as determined by published standards to provide high concentration of liquid agent in plenum areas and duct collars. Liquid agents be stored in containers equipped with pressure gauges to verify operational readiness. Nozzles located in plenum and ductwork shall be capable of functioning with heavy accumulation of grease.

c. The gas shut-off valve shall be furnished by the F.S.E.C. and the size verified by the plumbing engineer. The F.S.E.C. is responsible for coordinating installation with all trades.

d. Micro-switches for electrical equipment shut off and/or actuation of fire alarm system shall be furnished as part of the fire protection system by the manufacturer and connected to the shunt trip provided and installed by the Electrical Contractor. The Electrical Contractor is to furnish and install a control relay to detect the operation of the system by connection to the Micro switches supplied by the Fire Protection System Contractor. The Electrical Contractor is to interface with the building alarm system and/or the fire command station and the micro switches as specified as well as interconnections between system and UDS system.

e. All access openings, holes, sleeves, chases, etc. in the building structure necessary to permit piping and control tubing to be run between system units, ventilator, and ductwork are to be provided by the General Contractor.

f. Provision shall be made to shut off the gas and electric supply to all cooking equipment upon actuation of the system.

Q. ITEM: MS-118
1. QUANTITY: 2
2. MANUFACTURER: ADVANCE TABCO
3. MODEL: AS-FT2436FG-MOD-ADA
4. DESCRIPTION: FLOOR TROUGH
   a. Floor trough as shown on plan 30”x 36” x 9" deep, 14-gauge 304 stainless steel fully welded, water-tight and polished trough, with built-in pitch to a 6 ½” waste outlet with removable perforated waste basket the length of the center of the trough, 5” waste outlet with removable scrap basket, 4” OD tailpiece, coved corners, anchor straps, and anti-splash construction. Grating is to be fiberglass PFG, fabricated with an antislip surface, “I” cross bars are 1” deep and are spaced 0.9” apart, and gray in color. NSF listed and ADA Compliant. F.S.E.C. to verify the pour path, trough sizing, and positioning.

END OF SECTION 114000

SECTION 114001 - FOOD SERVICE ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Food Service Accessories

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.

B. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.

C. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.

D. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on accessories; indicate configuration, sizes, materials, finishes, and locations.

C. Certificates: Certify that products of this section meet or exceed specified requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products clear of floor in a manner to prevent damage.

B. Coordinate size of access and route to place of installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Food Service Accessories: Provide equipment manufactured by Advance Tabco, or comparable products by:
   1. Eagle Group: www.eaglegrp.com/#sle
   2. John Boos & Co.: www.johnboos.com/#sle
   3. New Age Industrial Corp. Inc: www.newageindustrial.com/#sle
   4. Regency Equipment by Clark Core Services, LLC: www.regencyequipment.com/#sle
   5. Substitutions: See Section 016000 - Product Requirements.

2.2 EQUIPMENT

A. Wall Mounted Pot Racks
   1. Basis of Design: Advance Tabco Model #SW-72
      a. Design: Double Bar
      b. Width: 72 inches, minimum
      c. Depth: 12 inches
      d. Weight: 34 lb
      e. Construction: 1/2 inch by 2 inch stainless steel
      f. Holders/Hooks: 18 minimum
   2. Installation Accessories: Provide hardware, supports and connections, attachment devices, andnd accessories as required for complete installation.

2.3 MATERIALS

A. Stainless Steel Sheet: ASTM A666 Type 304 commercial grade, No. 4 finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify supports are correct and in required location.

B. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install items in accordance with manufacturers' instructions.

B. Insulate to prevent electrolysis between dissimilar metals.

C. Use anchoring devices appropriate for equipment and expected usage.

3.3 ADJUSTING

A. Adjust equipment and apparatus to ensure proper working order and conditions.

B. Remove and replace equipment creating excessive noise or vibration.

3.4 CLEANING

A. Remove masking or protective covering from stainless steel and other finished surfaces.

B. Wash and clean equipment.

C. Polish hardware, accessories, fixtures, and fittings.

3.5 PROTECTION

A. Remove protective coverings from prefinished work.

B. Protect finished work from damage.

END OF SECTION 114001

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SECTION 122413 - WINDOW SHADES

PART 1 GENERAL

1.1 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 SUMMARY

A. Section Includes:
   1. Manually-operated roller shades with single rollers.
   2. Non-operable shading systems for miscellanous shapes.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples: For each exposed product and for each color and texture specified, 10 inches long.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material, signed by product manufacturer.

C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Warranty: Sample warranty of Window Fabric and Components as provided by manufacturer.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
   1. Methods for maintaining roller shades and finishes.
   2. Precautions about cleaning materials and methods that could be detrimental to

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Manually-Operated Shades: Provide an additional one (1) manually-operated shades for each window installed, as attic stock for Owner.
   2. Miscellaneous Shaped Shades (Arched Windows): Provide an additional one (1) miscellaneous shaped shades, including non-operable and manually-operated sections, for each window installed, as attic stock for Owner.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. WARRANTY
   1. Roller Shade Installation: One (1) year from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design: Basis-of-Design Product: Subject to compliance with requirements, provide products manufactured by Draper Inc., or a comparable product by one of the following:
   1. Hunter Douglas Contract
   2. MechoShade Systems, Inc.
   3. Approved equal.

B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY-OPERATED SHADES WITH SINGLE ROLLERS

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
   1. Bead Chains: Stainless steel.
      a. Loop Length: Full length of roller shade.
      b. Limit Stops: Provide upper and lower ball stops.
      c. Chain-Retainer Type: Clip, jamb mount.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently- lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
   1. Roller Drive-End Location: Right side of inside face of shade.
   2. Direction of Shadeband Roll: Regular, from back of roller.
   3. Shadeband-to-Roller Attachment: Removable spline fitting integral channel in tube.

C. Mounting Hardware: Brackets or end caps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

E. Shadebands:
   1. Shadeband Material:: Light-filtering fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: Same as shadeband.

F. Miscellaneous Shaped Shades (Arched Windows):

1. Provide manufacturer's recommended arched non-operable shading system to size and shape of each unique opening where top of window is not orthogonal.
2. Provide manual operated shades with single horizontal rollers below fixed shading system to allow for typical shade operation. Manual operated shades should meet requirements indicated above.

G. Installation Accessories:
1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller end caps without exposed fasteners.
a. Shape: L-shaped.
b. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open, but not less than 4 inches.
2. Endcap Covers: To cover exposed endcaps.
3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
1. Source: Roller-shade manufacturer.
2. Type:: Vinyl-Coated Fiberglass or Vinyl- Coated Polyester
3. Weave: Basketweave
4. Roll Width: As required to cover window indicated on drawings.
5. Openness Factor: Three percent (3%) .
6. Color:: As selected by Architect from manufacturer's full range.

2.4 ROLLER-SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.

2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:
   1. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
   1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

B. SCHEDULE

C. Light Filtering Shade Locations: All window facing South except windows in Computer Classroom first floor.

D. Light Blocking Shade Locations: South facing windows in Computer Room first floor.

END OF SECTION 122413

SECTION 123661 - SOLID SURFACING MATERIALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid surface material sills and stools.

1.2 ACTION SUBMITTALS

A. Product Data: For sill and stool materials.

B. Shop Drawings: For sills and stools. Show materials, profiles, and methods of joining.
   1. Show locations and details of joints.
   2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:
   1. Sills and stools, 6 inches square.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface materials 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.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate materials similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of solid surface materials.

C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
   1. Build mockup of typical sills and stools 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 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of solid surfacing sills and stools by field measurements before fabrication is complete.

PART 2 PRODUCTS

2.1 SOLID SURFACE MATERIALS

A. Basis of Design Product: Subject to compliance with requirements, provide Corian quartz products manufactured by DuPont, or a comparable product by one of the following:
1. Formica Corporation
2. Meganite
3. Relang International LLC
4. Wilsonart, LLC
a. Type: Provide Standard type.
b. Colors: As selected by Architect from manufacturer's full range.

2.2 FABRICATION

A. Fabricate sills and stools according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
1. Grade: Custom.

B. Configuration:
1. Front: Straight, beveled edge

C. Sills and Stools: 1/2-inch thick, solid surface material.

D. Fabricate materials with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

E. Joints: Fabricate sills and stools without joints.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Sills and Stools: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface materials and conditions under which solid surface materials will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of sills and stools.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install sills and stools for full length of each window unit, securing to substrates with concealed fasteners and specified adhesive.

B. Provide minimum 1/8-inch expansion gap on both sides of sills and stools. Fill gap with specified joint sealant.

C. Install solid surfacing components plumb, level, and true with edges eased and sanded smoothed. Use woodworking and specialized fabrication tools acceptable to manufacturer.

3.3 REPAIRS

A. Remove and replace solid surfacing components that are damaged and cannot be satisfactorily repaired.

3.4 CLEANING AND PROTECTION

A. Clean solid surfacing components according to manufacturer's published maintenance instructions. Completely remove excess adhesives and sealants from finished surfaces.

B. Protect completed work from damage during remainder of construction period.

END OF SECTION 123661

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SECTION 131113 - SWIMMING POOL PIPING, VALVES & FITTINGS

PART 1 GENERAL

1.1 REFERENCE STANDARDS

A. ASTM D1784 - Standard Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds; 2025.

B. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80; 2024.

C. NSF 50 - Equipment and Chemicals for Swimming Pools, Spas, Hot Tubs, and Other Recreational Water Facilities; 2025.

1.2 RELATED DOCUMENTS

A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.3 SUMMARY

A. Work Included: Provide and install all Swimming pool main drain piping, valves and miscellaneous fittings necessary to complete the renovations and improvements detailed within the plans.

1.4 RELATED SECTIONS

A. Division 02: Existing Conditions

B. Division 13: Special Construction

C. Division 31: Earthwork

1.5 REFERENCES

A. New York State Department of Health, Subpart 6-1 (Regulations for Swimming Pools)

B. Model Aquatic Health Code (MAHC 4th Edition, 2023)

C. NSF 50- National Sanitation Foundation

D. ASTM D1784

E. ASTM D2467

1.6 QUALITY ASSURANCE

A. All work of this section shall be performed by the Swimming Pool Contractor or Sub-Contractor.

1.7 SUBMITTALS

A. Provide submittals in accordance with the requirements of the General Requirements of Division 01.

B. Provide all shop drawings, product data and certificates of compliance for all pipe and fittings for a complete submittal.

C. Substitutions: Include with request specified item, design, catalog number(s), and finish for each item on which approval is being requested ten (10) days prior to bid opening. Blanket approval by manufacturer's name only will not be given. Substitutions may not be granted after the ten-day period or after the project bid.

1.8 PRODUCT HANDLING

A. Delivery: Deliver all materials to the project site in the manufacturer's original unopened containers with all labels intact and legible.

B. Storage: Store all materials under cover in a manner to prevent damage and contamination and store only the specified materials at the project site.

C. Protection: Use all means necessary to protect piping materials before, during, and after installation and to protect the installed work of other trades.

D. Replacement: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Director's Representative and at no additional cost to The Town.

1.9 COORDINATION

A. The Contractor must establish with other Sub-Contractors, having related work in this Section that all work necessary to complete all pipe work as shown on the drawings and in the specifications is included in the bid to The District.

B. If in doubt regarding the responsibility for work covered in the Section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Director's Representative through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.10 WARRANTIES

A. In accordance with the General Requirements of Division 01.

1.11 EXTRA MATERIALS

A. No extra materials required for this Section.

PART 2 PRODUCTS

2.1 PIPING, FITTINGS & FLANGES

A. Swimming Pool Piping: NSF approved Schedule 80 PVC.

B. Bedding: Per Section 31 Earthwork.

C. Pipe Hangers and Supports: Per Section 131475 Swimming Pool Miscellaneous Metals.

D. All PVC Schedule 80 pipe and fittings shall be produced by Spears Manufacturing Company or approved equal from PVC Type I, cell classification 12454, conforming to ASTM Standard D1784. All injection molded PVC Schedule 80 fittings shall be certified for potable water service by NSF International and manufactured in strict compliance to ASTM D2467. All fabricated fittings shall be produced in accordance with Spears General Specifications for Fabricated Fittings. All PVC flanges shall be designed and manufactured to meet CL150 bolt pattern per ANSI Standard B16.5 and rated for maximum internal pressure of 150 psi, non-shock at 73-degrees F. Fabricated fittings are only allowed on fitting sizes greater than 12”.

E. All pipe/fittings shall bear the company’s name or trademark, material designation, size, applicable IPS or class rating, and the NSF stamp.

F. All flanges shall be PVC molded class 150 flange fitting coupling devices designed for joining IPS (Iron Pipe Size) plastic piping systems. Flanges shall be designed such that frequent disassembly may be required. Flanges shall also exhibit the use as a transitional fitting for joining plastic to metal piping systems. Injection molded flanges shall be produced from either PVC materials approved for potable water use by the National Sanitation Foundation (NSF®). Flange pressure ratings shall be 150 psi for water at 73°F. Flange type shall be Van Stone Style which is a two-piece design with rotating flange ring. Flanges shall be provided in socket configurations, sizes 1/2" through 24". Flanges shall be produced by Spears Manufacturing Company or approved equal.

2.2 BUTTERFLY VALVES: 2” – 12”

A. Lever Operated Butterfly valves shall be provided per plans on pipes up to and including 6" in size. Valves shall be the ASAHI Pool-Pro Type SP or approved equal. All "Pool-Pro" Type SP Butterfly Valves sizes shall be of a PVC Body, PVC Disc and EPDM construction suitable for chlorinated water applications. Stem shall be of 316 stainless steel and non-wetted. Valves shall be a self-gasketing design with a convex sealing arrangement. All Pool-Pro Type SP (1 1/2"-10") valves shall be rated to 150 psi as manufactured by Asahi/America, Inc. Material of construction allows complete submersion of valve body as all components are compatible with chlorinated water. Allows for field mounting of accessories including stem extensions, gear operators & automation. Eighteen (18) position throttle plate for lever handle style is provided.

B. Gear Operated Butterfly valves shall be provided per plans on pipes 8" up to and including 12" in size. Valves shall be the ASAHI Pool-Pro Type SP or approved equal. All Pool-Pro Type SP Butterfly Valves sizes shall be of a PVC Body, PVC Disc and EPDM construction suitable for chlorinated water applications. Stem shall be of 316 stainless steel and non-wetted. Valves shall be a self-gasketing design with a convex sealing arrangement. All Pool-Pro Type SP (1 1/2"-10") valves shall be rated to 150 psi and size (12") 100 psi at 70 degrees Fahrenheit as manufactured by Asahi/America, Inc. Material of construction allows complete submersion of valve body as all components are compatible with chlorinated water. Allows for field mounting of accessories including stem extensions, gear operators & automation.

2.3 POOL DRAIN & SERVICE VALVES

A. Butterfly valves shall be provided and installed for isolation purposes and shall be located within the underground valve pit. Non-corrosive butterfly valve shall be provided and installed for flow isolation and throttling.

B. Valves shall be the ASAHI Type-75 lug style butterfly valve as manufactured by Asahi/America, Inc., or approved equal.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS, INSPECTION AND PREPARATION

A. Verify that all work by others related to this Section is installed. This includes but is not limited to all earthwork, concrete foundations, and mechanical/electrical connections.

B. Prior to starting work, notify the Director's Representative of defects requiring correction. Do not begin work until conditions are satisfactory.

C. Protect other materials and installed work against damage caused by completing work in this section.

3.2 PIPING AND FITTINGS

A. Workmanship: Workmanship shall be in accordance with good commercial practice. Fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects in color, opacity, density, and other physical properties.

B. Installation: All pipe and fittings shall be installed according to the best recommendations of the manufacturer.

C. No lengths of PVC piping shall be unsupported for lengths in excess of fifteen feet. All pump discharge piping shall be properly supported, braced, and secured as necessary to minimize vibration.

D. Pitch of Pipes: Horizontal drainage lines shall be supported to a uniform slope and all piping shall be so installed as to avoid unnecessary turns in order that friction loss may be kept at a minimum. Suction piping shall be installed in order to prevent air traps. Gutter piping shall slope as shown on drawings.

E. All chemical tubing (if specified) shall be encased in Schedule 80 PVC piping with sweep fittings. All such piping systems shall be hand fitted without cement and shall be secured, strapped, and supported to avoid sagging.

3.3 WATER PIPE TESTING

A. All pool circulation piping installed on the project, unless specifically shown otherwise, shall be hydraulically tested as specified herein. Air and/or gas pressure testing is prohibited. Prior to backfill, all pool pipe pressure testing shall be inspected by Engineer for compliance.

B. Piping may be tested a section at a time in order to facilitate the construction.

C. Tests to be Performed: The Contractor shall fill the section of pipe to be tested with water. The tests shall be conducted by the Contractor. These tests shall be conducted before any pipe joint is covered.

D. Duration of Tests: All tests shall apply full test pressure to the piping until piping of the pool equipment has begun.

E. Pressure of Tests: All tests shall be conducted at 40 psi for a minimum 4-hour time period. Air pressure tests are not acceptable.

3.4 EXCAVATION AND BACKFILL

A. Excavation:
   1. Excavate and backfill as required for the Work of this Section.

2. The Contractor shall perform all excavation of every description and of whatever materials encountered, to depths indicated on the drawings or as necessary. The Contractor shall dispose of the excavated materials not required or suitable for backfill, as directed, and shall perform such grading as may be necessary to prevent surface water from flowing into the trenches. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters, which may accumulate in the excavated areas.

B. Backfilling:
   1. Material for backfilling of swimming pool pipes shall be approved material (per Division 31). No excavation materials shall be used as backfill.
   2. Backfilling pipe trenches shall commence immediately after installation and testing to preclude damage to the installed pipe. Backfill around pipe shall be carefully placed so as not to displace or damage the pipe and shall be carried up symmetrically on each side of the pipe to 1′-0″ above the top of the pipe. The material shall be carefully compacted or consolidated before additional backfill is placed.
   3. Unless otherwise indicated on the drawings, all pipes shall have a minimum of 18″ of cover.

3.5 PIPE IDENTIFICATION

A. All exposed pool piping within the Swimming pool equipment room shall be installed as per Model Aquatic Health Code Section 4.7.1.7.4 – Piping and Component Identification. See Below for Requirements:
   1. 4.7.1.7.4.1A - Clearly Marked: All exposed piping shall be clearly marked to indicate function.
   2. 4.7.1.7.4.2 - Flow Direction and Source: All piping shall be clearly marked to indicate type or source of water and direction of flow with clear labeling and / or color coding.
   3. 4.7.1.7.4.3 - Valves: All valves shall be clearly marked to indicate function with clear labeling and / or color coding.
   4. 4.7.1.7.4.4 - Schematic Displayed: A complete, easily readable schematic of the entire aquatic venue recirculation system shall be openly displayed in the mechanical room or available to maintenance and inspection personnel.

END OF SECTION 131113

SECTION 131143 - CHANNEL DRAIN SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes install a precast, interlocking polymer concrete trench drainage system in the pool deck slab as specified and as shown on the working drawings.

B. System Description: Modular trench drain system precast from a corrosion resistant polymer including interlocking modular components for on-site installation.

1.2 QUALITY ASSURANCE

A. Warranty:
   1. Channel drain system is included under the Project Warranty.

1.3 SUBMITTALS

A. Contractor will submit shop drawings showing a plan of the total drainage system listing all parts being provided with exact center-line dimensions suitable for installation. Copies of the manufacturer's recommended method of installation, assembly, and anchorage shall be submitted for review.

PART 2 PRODUCTS

2.1 MATERIALS

A. Physical and Mechanical Characteristics of Polymer Concrete Channel Units
   1. Top unit width - Approximately 6.1 inches.
   2. Internal width - Approximately 4.0 inches.
   3. Unit depth - Approximately 9.8 inches.
   4. Compressive strength of specified polymer concrete - 14,000 psi min.
   5. Flexural strength of specified polymer concrete - 3,000 psi min.
   6. Water absorption rate - not to exceed 0.1%.

B. Channel Profile shall include positive interlocking tongue and groove connections which can be sealed to provide water tight connections. Each precast polymer channel shall be an approximately 1.09 yard unit and be available in curved and straight sections.

C. Catch Basins shall be precast polymer concrete, 39.37" in length and include a plastic grating.

D. Channel Drainage System:
   1. ACO Sport – System 4020 or equal.

E. Grates:
   1. Grates are to be slotted steel.
   2. Grate locking devices are to be galvanized steel.
      a. ACO Sport Model No. 421 Grate combined drain and anchoring system grate, by ACO Sport or equal.

PART 3 EXECUTION

3.1 SITE PREPARATION

A. Excavate the area for channel placement wide enough to accommodate the channel size with a minimum of six inch concrete encasement. Channels require a minimum of six inches concrete support, and top of channel must be evenly aligned to the surface of the surrounding surface on both sides, as well as underneath the channel.

3.2 INSTALLATION

A. Install precast channel drain in accordance with the details on the plans and the manufacturer's instructions.

B. Channel sections are installed from the outlet ends of the system, working from the catch basins. Insert channels from above to allow ends to interlock. Channel sections shall be placed on brick, rebar basket, channel chair, low slump concrete grout slurry, or suspended to obtain correct finished elevation. Cutting will be made, if required, by masonry or concrete saw. Cover top of channel with tape, plastic, or plywood strips to protect the channel surface from concrete during pouring.

C. Finishing and Cleanup
   1. Following final set of concrete, remove protection covering top of channels.
   2. Install drain system in strict accordance with manufacturer's recommendations and shop drawings.

END OF SECTION 131143

SECTION 131146 - SWIMMING POOL DECK EQUIPMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 01.

1.2 SUMMARY

A. Work Included: Supply and install all swimming pool deck equipment items as required for this work as indicated in the Contract Documents and Drawings.

1.3 RELATED SECTIONS

A. Division 02: Sitework

B. Division 13: Special Construction

1.4 REFERENCES

A. New York State Department of Health, Subpart 6-1 (Regulations for Swimming Pools)

B. Model Aquatic Health Code (MAHC 4th Edition, 2023)

C. ADAAG: Americans with Disabilities Act Accessibility Guidelines

D. Virginia Graeme Baker Pool and Spa Safety Act

E. American National Standard ASME A112.19.8 – 2007 Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs.

1.5 QUALITY ASSURANCE

A. All work of this section shall be performed by the Swimming Pool Contractor or Sub-Contractor.

1.6 SUBMITTALS

A. Provide submittals in accordance with the requirements of the General Requirements of Division 01.

B. Provide all shop drawings and catalog data for a complete submittal.

C. Substitutions: Include with request specified item, design, catalog number(s), and finish for each item on which approval is being requested ten (10) days prior to bid opening. Blanket approval by manufacturer's name only will not be given. Substitutions may not be granted after the ten-day period or after the project bid.

1.7 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the swimming pool items before, during, and after installation and to protect the installed work of other trades.

B. Replacement: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the City.

1.8 COORDINATION

A. Coordinate with other Contractors all work relating to this Section.

B. The Swimming Pool Contractor must establish with other Sub-Contractors, having related work in this Section that all work necessary to complete renovations as shown on the drawings and in the specifications is included in the base bid and alternates to the City.

C. If in doubt regarding the responsibility for work covered in the Section and/or discovery of errors or omissions in the bidding documents, the Swimming Pool Contractor shall notify the Engineer through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.9 WARRANTIES

A. In accordance with the General Requirements of Division 01.

1.10 EXTRA MATERIALS

A. No extra materials required for this Section.

PART 2 PRODUCTS

2.1 DECK EQUIPMENT

A. Anchor Sockets / Wedge style: (Qty. 6) shall be Paragon Aquatics I.D. No. 28102, Spectrum Products, or approved equal and shall be used for anchoring stair rails. Wedge anchor shall be cast bronze with a locking bronze wedge assembly (with a stainless-steel bolt) and shall be 4" deep penetration. Anchors shall be coordinated and installed by the Swimming Pool Contractor. Verify quantity on drawings.

B. Escutcheon Covers: (Qty. 6) shall be Paragon Aquatics I.D. No. 28301SS or approved equal and shall be used for anchor locations at stair and grab rails. Escutcheons shall be stainless steel and shall be fabricated via investment casting method (Stamped stainless steel covers are not considered an equal). It shall have a set screw for fastening cover to rail. Escutcheons shall be coordinated and installed by the Swimming Pool Contractor. Verify quantity on drawings.

C. Stainless steel stanchion anchors (Qty. 6) shall be 10″ deep and made for 1.90″ O.D. pipe. Anchors to be Paragon Aquatics or approved equal.

D. Starting Block Anchors: (Qty. 12) shall be the Track Start Plus+ Competitor starting platform anchor by Paragon Aquatics or approved equal. Anchor assembly shall be 23103DW. Anchors are to be installed as per manufacturer's installation instructions.

E. Starting Blocks: (Qty. 6) shall be the Track Start Plus+ Competitor Model#24514 starting platform by Paragon Aquatics or approved equal. It shall have an elevated platform top supported by a sloping stainless-steel frame. The platform frame shall be manufactured of 1.90″ diameter x .109″ wall thickness Type 304 stainless steel polished to a 320-grit finish. The platform posts shall be reinforced with a welded 1.66″ diameter x .140″ wall thickness T304 stainless steel insert. The backstroke bar shall be made of 1″ diameter x .065″ wall thickness Type 304 stainless steel polished to a 320-grit finish and located in a range consistent with all ruling bodies. The backstroke bar and step support shall be fully welded to the pedestal. The platform top (24″ wide x 32″ deep) shall be constructed of UV inhibited high density polypropylene. It shall have a dual non-skid cross-grooved with a sand textured finish surface and will be upgraded with a custom logo of the Washingtonville emblem (logo to be provided during shop review process). The top shall be permanently positioned at a 10° tilt towards the pool. The platform steps shall be made of polypropylene with the same sand non-skid finish. The platform shall be anchored to the patented taper-lock 6″ Competitor anchor socket and shall be removable without the use of tools. The Track Start Plus+ Competitor Platform shall have six (6) starting platforms Track Start Safety+ covers shall also be provided (model #23969) for when the platforms are not in use.

F. Track Start Plus+ Adjustable Backplate Kit: (QTY. 6) I.D. No. 27500 – by Paragon Aquatics or approved equal. It shall be constructed of T304 stainless steel. It is powder coated in black for additional corrosion resistance. Color to be selected by Owner

G. Track Start Plus+ Side Hand Grip Kit: (Qty. 2 per starting platform- 12 total) I.D No. 27501 by Paragon Aquatics or approved equal. It shall have 2 polished 1″ O.D stainless steel tubes welded to ta heavy duty mounting plate, rubber non-slip grips, and stainless mounting hardware.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection: Prior to all work in this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.

B. Verify that the swimming pool equipment items may be installed in strict accordance with the original design, pertinent codes and regulations, and the manufacturer's recommendations. lightning

3.2 INSTALLATION

A. Supply and install items of swimming pool equipment in strict accordance with pertinent codes and regulations, the original design, and the manufacturer's published recommendations, anchoring firmly and securely for long life under frequent use. Coordinate with other trades to ensure all imbedded items are set plumb and flush. Railing ends must have anchor sockets and escutcheon covers. Be certain that deck equipment and railings are properly bonded prior to imbedding.

3.3 INSTRUCTION

A. Once final inspection and approval is met by the City, the Swimming pool Contractor shall instruct the maintenance personnel in the proper operations and maintenance of installed equipment.

END OF SECTION 131146

SECTION 131149 - SWIMMING POOL GUTTER CLEANING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. This Section includes general administrative and procedural requirements for all work. The administrative and procedural requirements included in this Section are to expand the requirements specified in Division 1.

1.2 SUMMARY

A. Work Included: Contractor shall complete the detailed cleaning of the existing stainless-steel gutter as required for this work as indicated in the Contract Documents and Drawings.

1.3 REFERENCES

A. NYSDOH Subpart 6-1: Swimming Pools

1.4 QUALITY ASSURANCE

A. All work of this section shall be performed by the Swimming Pool Contractor or Sub-Contractor under the General Construction contract.

1.5 SUBMITTALS

A. Provide submittals in accordance with the requirements of the General Requirements of Division 1.

B. Provide shop drawings and catalog data for all stainless-steel cleaning products to be used and the procedures to be completed.

C. Substitutions: Include with request specified item, design, catalog number(s), and finish for each item on which approval is being requested ten (10) days prior to bid opening. Blanket approval by manufacturer's name only will not be given. Substitutions may not be granted after the ten-day period or after the project bid.

1.6 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the surrounding swimming pool during the cleaning of the stainless steel. Any damage resulting from non-protected surfaces will need to be corrected at the Contractor's expense.

1.7 COORDINATION

A. Coordinate with other Contractors all work relating to this Section.

B. The Swimming Pool Contractor must establish with other Sub-Contractors, having related work in this Section that all work necessary to complete pool cleaning as shown on the drawings and in the specifications is included in the base bid to the Owner.

C. If in doubt regarding the responsibility for work covered in the Section and/or discovery of errors or omissions in the bidding documents, the Swimming Pool Contractor shall notify the Architect through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.8 WARRANTIES

A. In accordance with the General Requirements of Division 1.

1.9 SYSTEM TRAINING

A. Refer to section 131100 section 1.10 for specifics.

1.10 EXTRA MATERIALS

A. No extra materials required for this Section.

PART 2 PRODUCTS

2.1 CLEANING EQUIPMENT & PRODUCTS

A. The following stainless-steel cleaners provided by Stellar Solutions shall be used to remediate the existing corrosion. Specific products should be used for each application to remove all existing surface staining & pitting.
   1. CitriSurf: Citric acid-based cleaning and passivation solution should be the first process applied. Contractor shall follow manufacturer's recommended application process.
   2. Rust Rescue: shall be applied to provide additional protection in corrosive environments and on pitted stainless steel.
   3. Weld Wizard: alternatives to hazardous nitric acid pickling for removing the heat discolorations around welds.
   4. KleerKleen: shall be provided for additional cleaning when needed.

2.2 PRESSURE TESTING

A. Provide the necessary pressure testing equipment and resources to successfully test the gutter chambers.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection: Prior to all work in this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.

B. Verify that the swimming pool stainless steel cleaning items may be applied in strict accordance with the original design, pertinent codes and regulations, and the manufacturer's recommendations.

3.2 APPLICATION

A. Complete cleaning of stainless-steel gutters and bulkhead to remove all surface corrosion and pitting. Apply products listed above as necessary to complete process. Use manufacturer's recommended application processes.

B. Re-apply if necessary.

3.3 INSTRUCTION

A. Once final inspection and approval is met by the Owner's Representative, the Swimming pool Contractor shall instruct the maintenance personnel in the proper operations and maintenance of cleaned stainless-steel products.

END OF SECTION 131149

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