

Project Manual



7th Floor Isotope Renovation
El Paso, Texas

Construction Documents
February 07, 2025



UMC EL PASO CHILDREN'S HOSPITAL
7TH FLOOR ISOTOPE RENOVATION
EL PASO, TEXAS

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FOURTH COLUMN: SPECIFICATION SECTION NUMBER

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NOTE FOR REVISED SPECIFICATION SECTIONS

1. DELETED INFORMATION IS INDICATED BY A STRIKETHROUGH (IE, ~~THIS IS DELETED~~).
2. NEW INFORMATION IS INDICATED BY A DOUBLE UNDERLINE (IE, THIS IS ADDED).
3. ALL REVISED INFORMATION IS FURTHER IDENTIFIED BY A HEAVY VERTICAL LINE TO THE RIGHT OF ALL REVISIONS IN EACH INDIVIDUAL SPECIFICATION SECTION (REFER TO HEAVY BOLD LINE TO THE RIGHT FOR AN EXAMPLE).

ISSUES

2025-02-07 Construction Documents

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

2025-02-07	<input checked="" type="checkbox"/>	0	00 3100	Available Project Information
2025-02-07	<input checked="" type="checkbox"/>	0	00 7300	Supplementary Conditions

DIVISION 01 - GENERAL REQUIREMENTS

2025-02-07	<input checked="" type="checkbox"/>	0	01 1000	Summary
2025-02-07	<input checked="" type="checkbox"/>	0	01 2300	Alternates
2025-02-07	<input checked="" type="checkbox"/>	0	01 2500	Substitution Procedures
2025-02-07	<input checked="" type="checkbox"/>	0	01 2600	Contract Modification Procedures
2025-02-07	<input checked="" type="checkbox"/>	0	01 2900	Payment Procedures
2025-02-07	<input checked="" type="checkbox"/>	0	01 3100	Project Management and Coordination
2025-02-07	<input checked="" type="checkbox"/>	0	01 3200	Construction Progress Documentation
2025-02-07	<input checked="" type="checkbox"/>	0	01 3300	Submittal Procedures
2025-02-07	<input checked="" type="checkbox"/>	0	01 4000	Quality Requirements
2025-02-07	<input checked="" type="checkbox"/>	0	01 4200	References
2025-02-07	<input checked="" type="checkbox"/>	0	01 5000	Temporary Facilities and Controls
2025-02-07	<input checked="" type="checkbox"/>	0	01 6000	Product Requirements
2025-02-07	<input checked="" type="checkbox"/>	0	01 7300	Execution
2025-02-07	<input checked="" type="checkbox"/>	0	01 7419.13	Construction Waste Management and Disposal
2025-02-07	<input checked="" type="checkbox"/>	0	01 7700	Closeout Procedures
2025-02-07	<input checked="" type="checkbox"/>	0	01 7823	Operations and Maintenance Data
2025-02-07	<input checked="" type="checkbox"/>	0	01 7839	Project Record Documents
2025-02-07	<input checked="" type="checkbox"/>	0	01 7900	Demonstration and Training
2025-02-07	<input checked="" type="checkbox"/>	0	01 8116.16	Construction Requirements for VOCs

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DIVISION 02 - EXISTING CONDITIONS

2025-02-07 0 02 4119 Selective Demolition

DIVISION 03 - CONCRETE

2025-02-07 0 03 0150 Concrete Patching

DIVISION 04 - MASONRY

NO SECTIONS

DIVISION 05 - METALS

2025-02-07 0 05 5000 Metal Fabrications

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

2025-02-07 0 06 1053 Miscellaneous Rough Carpentry

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

2025-02-07 0 07 8413 Penetration Firestopping
2025-02-07 0 07 9200 Joint Sealants

DIVISION 08 - OPENINGS

2025-02-07 0 08 1113 Hollow Metal Doors and Frames
2025-02-07 0 08 1416 Prefinished Flush Wood Doors
2025-02-07 0 08 3113 Access Doors and Frames
2025-02-07 0 08 7100 Door Hardware
2025-02-07 0 08 8020 Interior Glass and Glazing

DIVISION 09 - FINISHES

2025-02-07 0 09 2900 Gypsum Board Assemblies
2025-02-07 0 09 3000 Tiling
2025-02-07 0 09 6513 Resilient Base and Accessories
2025-02-07 0 09 9100 Interior Painting

DIVISION 10 - SPECIALTIES

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2025-02-07 0 11 7000 Medical Equipment

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SECTION 00 3100

AVAILABLE PROJECT INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section references other information relevant to the construction of this Project that is available project information.
- B. At the request of the Owner, the information identified below represents services that have been provided by others, not as a Consultant, regarding conditions that affect this Project that are beyond the responsibilities of the Consultants. Reference to such information herein is solely for the convenience of the Owner.
- C. Bidders are expected to examine the site and the information available from the Owner to determine for themselves the conditions to be encountered.
- D. If conditions other than those indicated in the information available from the Owner are encountered before or during construction, notify the Owner before work continues.

1.2 INFECTION CONTROL RISK ASSESSMENT REPORT

- A. The Owner's Risk Assessment Consultant has assessed the environmental impact of the work on the existing, adjacent healthcare functions, and has prepared an Infection Control Risk Assessment (ICRA) report that includes specific requirements of the Contractor.
- B. Copies will be provided by the Owner.
- C. The ICRA establishes strategic infection control provisions and requirements for the purpose of controlling the dissemination of airborne micro-organism contaminants encountered or generated during the construction process through the use of containment protocols and environmental monitoring.

1.3 MEDICAL EQUIPMENT DOCUMENTS

- A. The Owner's Medical Equipment Planning Consultant has developed medical equipment documents for the Owner's facility and has prepared construction documents.
- B. Copies will be provided by the Owner.

1.4 RADIATION PROTECTION REPORT

- A. The Owner's Radiation Protection Consultant has determined the radiation protection that is required, and has prepared a report that contains specific requirements of the Contractor.
- B. Copies will be provided by the Owner.

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

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SECTION 00 7300

SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

1.1 GENERAL

- A. The Supplementary Conditions modify, change, delete from or add to the General Conditions and shall apply to each and every Section of the Work as though written in full therein.
- B. The following paragraphs and subparagraphs take precedence over the General Conditions. Where any part of the General Conditions is modified or deleted by the Supplementary Conditions, the unaltered provisions remain in effect.
- C. Correlation and Intent of the Contract Documents:
 - 1. Sections of Division 01 - General Requirements govern the execution of all sections of the specifications.
 - 2. Summary paragraphs placed at the beginning of the Sections present a brief indication of the principal Work included in that Section, but do not limit Work to subject mentioned nor purport to itemize Work that may be included.
 - 3. The Relation of Specifications and Drawings shall be equal authority and priority. Should they disagree in themselves, or with each other, bids shall be based on the most expensive combination of quality and quantity of work indicated. The appropriate Work, in the event of the above mentioned disagreements, shall be determined by the Architect.
 - 4. Should the Drawings disagree themselves, figures shall govern over scaled measurements, large scaled Drawings shall govern over small scale Drawings, the greater quantity of work or materials shall be furnished and performed; the descriptive writings shall govern over legends indicating material or conditions and the Agreement takes precedence over all other Contract Documents.
 - 5. Failure to report a conflict in the Contract Documents shall be deemed evidence that the Contractor has elected to proceed in the more expensive manner.
 - 6. Instructions, directions and requirements as specified shall be considered to be followed by the phrase "unless otherwise specified or indicated".

1.2 INTERPRETATION

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

1.3 INFORMATIONAL SUBMITTALS

- A. Informational submittals may be so identified in the Contract Documents.

1.4 PROFESSIONAL CERTIFICATION

- A. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.

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PART 2 - (NOT USED)

PART 3 - (NOT USED)

END OF SECTION

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SECTION 01 1000

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Owner-furnished, Owner-installed (OFOI) products.
2. Owner-furnished, Contractor-installed (OFICI) products.
3. Worker conduct and appearance - work rules.
4. Healthcare facility renovation work.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and drawing conventions.

1.2 OWNER-FURNISHED, OWNER-INSTALLED (OFOI) PRODUCT

A. The specific product is not in this contract, and actual installation of the product will be made by the Owner.

B. Products will be indicated as follows:

1. Product prefixed with "Space for"
2. N.I.C.
3. Owner Furnished - Owner Installed
4. Product noted as "Future"

C. Roughing-in for Owner Furnished, Owner Installed Product is provided by applicable Sections governing the type of work. Obtain rough-in requirements from Owner.

1.3 OWNER-FURNISHED, CONTRACTOR-INSTALLED (OFICI) PRODUCT

A. Install products indicated as follows:

1. "Owner Furnished, Contractor Installed".
2. "Reuse".
3. "Relocate".

B. Provide labor, transportation, materials, tools, appliances and utilities necessary for the following:

1. Relocated Products:

- a. Removing installed product from the Owner's existing facility, as required.
- b. Transportation of product from Owner's facility to the job site.

2. Receiving and storage of Owner furnished, Contractor installed product, as required.

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3. Providing materials and components for the product as necessary to install in an operating condition, but not including repairing of existing damages to the product.
4. Modification of product only as specified under the particular item.
5. Installation of product in this project, complete and in operating condition, including the adjusting and calibration of the product as necessary for proper operation.
6. Testing of product.
7. Paying of fees, licenses, and taxes in conjunction with the installation of the product.
8. Roughing-in and final utility connections for the Owner furnished, Contractor installed product remains the work of Sections governing the specific utility.

1.4 WORKER CONDUCT AND APPEARANCE - WORK RULES

A. General: The conduct and appearance of each worker at the jobsite is of paramount importance. The Owner reserves the right to require any worker to be reassigned to work outside the Owner's property.

1. Privacy: Where applicable, conduct work of the Contract with the maximum effort to maintain the privacy of the Owner's operations, staff, and clientele. Do not permit workers to peer into other areas of the building visible from the work area. Invasion of privacy is a major infraction of the work rules.
2. Conduct and Demeanor: Construction workers shall treat other construction workers, Owner's staff, clientele, and visitors (as applicable) professionally with respect and courtesy.
3. Physical Appearance: Require each worker to dress appropriately in a clean, neat, and professional manner.
4. Radios and Television: The use of entertainment devices including personal devices with headphones or earphones is prohibited at all times. Control the volume of communication radios and loudspeakers to avoid creating a nuisance.
5. Tobacco Products: The use of tobacco products is prohibited.
6. Language: The use of foul language is prohibited.
7. Loud Conduct: Screaming, yelling, and unnecessary loud conduct is prohibited.
8. Physical Actions: Running, horseplay, fighting, and other unprofessional conduct is prohibited. Fighting is a major infraction of the work rules.
9. Stealing: Stealing of any material, objects, furnishings, equipment, fixtures, supplies, clothing, or other items is prohibited and a major infraction.
10. Sexual Harassment: All forms of physical and verbal sexual harassment including, without limitation: touching; whistling; sexually explicit stories, jokes, drawings, photos, and representations; exhibitionism; and all other sexually oriented offensive behavior is prohibited.
11. Roaming: Construction personnel shall not be allowed to roam, or wander about, the existing facilities.
12. Eating: Construction personnel shall not use the existing Dining Area for breakfast, lunch, or dinner.
13. Parking: Construction personnel shall only park in designated areas reserved for construction parking.
14. Penalties: First infraction of the work rules shall result in a verbal warning from the Owner. Second infractions shall result in being requested to leave the Owner's property. Owner's decision in such matters shall be final with no exceptions.

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- B. Warnings and Dismissal: For minor infraction of the rules, the Owner may issue a warning. Only one warning will be allowed per worker, and a second infraction shall result in immediate dismissal of the worker from the Owner's property. For major infractions such as invasion of privacy, the worker shall be dismissed immediately without warning and possibly subject to criminal prosecution.
- C. Notification of Workers: Clearly notify and educate each worker about these Work Rules and the requirements for worker conduct and appearance.

1.5 HEALTHCARE FACILITY RENOVATION WORK

- A. Interim Life Safety Measures (ILSM): The following Interim Life Safety Measures (ILSM) as established by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) shall be implemented, documented and enforced in and adjacent to all construction areas:
 - 1. Ensure that exits provide free and unobstructed egress. Personnel shall receive training, and the Medical Office Building shall be notified if alternative exits must be designated. Buildings/areas under construction must maintain escape facilities for construction workers at all times. Means of egress in construction areas must be inspected daily.
 - 2. Ensure free and unobstructed access to emergency department/service and for emergency forces.
 - 3. Ensure that fire alarm, detection, and suppression systems are not impaired. A temporary, but equivalent, system shall be provided, and the Medical Office Building shall be notified, when any fire system is impaired. Temporary systems must be inspected and tested monthly.
 - 4. Ensure temporary construction partitions are smoke tight and built of non-combustible or limited combustible materials that will not contribute to the development or spread of fire.
 - 5. Provide additional fire-fighting equipment and use training for personnel.
 - 6. Prohibit smoking in or adjacent to all construction areas.
 - 7. Develop and enforce storage, housekeeping, and debris-removal practices that reduce the flammable and combustible fire load of the building to lowest level necessary for daily operations.
 - 8. Conduct a minimum of two fire drills per shift per quarter.
 - 9. Increase hazard surveillance of buildings, grounds, and equipment with special attention to excavations, construction areas, construction storage, and field offices.
 - 10. Train personnel, and notify the Medical Office Building, when structural or compartmentation features of fire safety are compromised.
 - 11. Conduct organization wide safety education programs to assure awareness of deficiencies, construction hazards, and these ILSM.

1.6 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Confine constructions operations to work in areas indicated on drawings.
 - 2. Allow for Owner occupancy of site and use by the public.
 - 3. Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times.

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4. Do not use drives and entrances for parking or storage of materials.
5. Schedule deliveries to minimize use of driveways and entrances.
6. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
7. Coordinate use of premises under direction of Owner.
8. Assume full responsibility for the protection and safekeeping of Products under this Contract, stored on the site.
9. Move any stored Products, under Contractor's control, which interfere with operations of the Owner or separate contractor.
10. Obtain and pay for the use of additional storage or work areas needed for operations.

- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.8 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

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- B. On-Site Work Hours: Coordinate the limitations relative to working hours in the existing building with Owner.
- C. Existing Utility Interruptions: Refer to Division 01 Section "Execution" for requirements.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than 72 hours in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - 3. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 2500

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 SUBMITTALS

- A. Substitution Requests: Submit electronic copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use scanned PDF electronic file of form provided at end of this section or annotated PDF electronic file of electronic form received from Architect matching form provided at end of this section.
 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

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- h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, with reasonable promptness, Architect will request additional information or documentation for evaluation. Architect will notify Contractor of acceptance or rejection of proposed substitution with reasonable promptness. Acceptance of proposed substitution does not constitute approval or inclusion in Contract Documents. Pay applications certification, change orders, and certificate of substantial completion will contain such qualification.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Prior to starting Substitution Process, review proposed recommendations with Architect.
- B. Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples for construction activities not complying with Contract Documents does not constitute acceptable or valid request for substitution, nor does it constitute approval.
- C. Contractor Representations: By making substitution request, Contractor:
 - 1. Recognizes burden of proof of equality for requested substitution rests with Contractor.
 - 2. Represents and warrants that Contractor has personally investigated requested substitution and determined that it is equal to or superior in all respects to specified Work.

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3. Represents and warrants that Contractor will provide same warranties for requested substitution that Contractor would for specified Work.
 4. Certifies that cost data presented is complete and includes all related costs under this Contract except for Architect's redesign cost, and waives all claims for additional costs related to requested substitution which may subsequently become apparent.
 5. Will coordinate installation of accepted substitution, making such other changes as may be required to make Work complete in all respects.
 6. Represents and warrants that accepted substitution will perform same as specified Work would have performed. Should accepted substitution fail to perform as required, Contractor shall replace accepted substitution with specified Work at no additional cost to Owner.
- D. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution provides sustainable design characteristics that specified product provided.
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
- E. Substitutions for Convenience:
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Requested substitution provides sustainable design characteristics that specified product provided.
 - e. Substitution request is fully documented and properly submitted.
 - f. Requested substitution will not adversely affect Contractor's construction schedule.

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- g. Requested substitution has received necessary approvals of authorities having jurisdiction.
- h. Requested substitution is compatible with other portions of the Work.
- i. Requested substitution has been coordinated with other portions of the Work.
- j. Requested substitution provides specified warranty.

PART 3 - EXECUTION (Not Used)

END OF SECTION

Substitution Request Form

To HKS Contract Manager _____

HKS Project No. _____ Project Name _____

Specified Item _____

Section	Page	Paragraph	Description
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The undersigned General Contractor requests consideration of the following:

Proposed Substitution _____

(Include all product data as indicated in Specification Section 01 2500 and any supplemental information as requested by the Architect.)

The undersigned General Contractor warrants to the Architect and Owner that the following paragraphs, unless modified on attachments, are correct.

1. The Proposed Substitution does not affect dimensions shown on Drawings.
2. The cost reduction/increase indicated in item 5 below includes costs for changes to the building design, including engineering, design, detailing and construction costs caused by the requested Substitution. Any additional costs resulting from this substitution will be reimbursed from the cost savings in item 5 or, in it's absence, funded as a project cost.
3. The Proposed Substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
4. Maintenance and service parts will be locally available for the Proposed Substitution.

The General Contractor further warrants to the Architect and Owner that the function and quality of the Proposed Substitution are equivalent or superior to the Specified Item. The General Contractor further warrants that specification section 01 2500, paragraph 2.1G intent has been met.

5. Total Cost Savings/Increase to the Owner: \$ _____
6. Compensation to the Architect / Consultant for related Additional Service Fee: \$ _____

Manufacturer's Certification of Equal Quality

I _____ represent the manufacturer of the Proposed Substitution item and hereby certify and warrant to the Architect and Owner that the function and quality of the Proposed Substitution are equivalent or superior to the Specified Item.

_____	_____	_____
Manufacturer's Representative	Date	Company

Acceptances

1. _____

_____	_____	_____
General Contractor Acceptance	Date	Company

2. _____

_____	_____	_____
Owner Acceptance	Date	Company

3. _____

_____	_____	_____
Architect Acceptance	Date	Company

Recommend Acceptance: Yes No

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SECTION 01 2600

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on Architect's Form HKS-710 "Architect's Supplemental Instructions"; copy attached at the end of this Section.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposed Change: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time using Architect's Form HKS-709 "Proposed Change"; copy attached at the end of this Section. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposed Changes issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposed Change or with reasonable promptness, when not otherwise specified, after receipt of Proposed Change, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

- a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
- b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
- c. Include costs of labor and supervision directly attributable to the change.
- d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- e. Include updated Submittal Schedule showing effect of the change.

- B. Contractor-Initiated Proposed Change: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect using Contractor's Standard Form.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

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2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Include updated Submittal Schedule showing effect of the change.
7. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.4 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: If applicable, see Division 01 Section "Allowances" for administrative procedures for preparation of Proposed Change for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: If applicable, see Division 01 Section "Unit Prices" for administrative procedures for preparation of Proposed Change for adjusting the Contract Sum to reflect measured scope of unit-price work.
- C. Alternates: If applicable, see Division 01 Section "Alternates" for administrative procedures for preparation of Proposed Change for adjusting the Contract Sum to reflect measured scope of alternate work.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposed Change, Architect will issue a Change Order for signatures of Owner and Contractor on Architects Form HKS-701 "Change Order"; copy attached at the end of this Section.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on Architects Form HKS-714 "Construction Change Directive"; copy attached at the end of this Section. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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Change Order

To:
[Contractor Name & Address]

Project & Address:
[Project Name & Address]

The Contract is changed as follows:

Addition of Civil and Structural Pier Package (attached as Exhibit One—Change Order One) to the original contract.

Change Order No.:
[Number]

Initiation Date:
[Date]

Architects Project No.:
[Project No.]

Contract for:
[for]

Contract Date:
[Date]

Summary:

- The original (Contract Sum)(Guaranteed Maximum Cost) was **\$275,000.00**
- Net change by previously authorized Change Orders **\$0.00**
- The (Contract Sum) (Guaranteed Maximum Cost) prior to this Change Order was **\$275,000.000**
- The (Contract Sum) (Guaranteed Maximum Cost) will be (increased)(decreased)(unchanged) by this Change Order **\$4,411,665.00**
- The new (Contract Sum) (Guaranteed Maximum Cost) including this Change Order will be **\$4,686,655.00**
- The Contract Time will be (increased) (decreased) (unchanged) by **0 Days**
- The Date of Substantial Completion as of the date of this Change Order therefore is **October 1, 2016**
- Changes included in the summary above (do) (do not) include modifications which have been authorized by Construction Change Directive(s).

XXX	XXX	XXX	XXX
Owner	Address	Signature	Date
HKS Inc.	999 18th St #2255N, Denver, CO 80202		XXX
Architect	Address	Signature	Date
XXX	XXX		XXX
Contractor	Address	Signature	Date

This Change Order is NOT in effect and will not be included in the Contract Documents until signed by the Owner, Architect and Contractor. Changes included herein are subject to all conditions affecting them under the substitution specification section.

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Proposed Change

To:
[Contractor Name & Address]

This is not a change order. Do not proceed with this work until authorized by Owner in writing below. Submit an itemized breakdown of labor and materials, and perform all work described herein in accordance with applicable Contract Documents.

Project & Address:
[Project Name & Address]

Contractor pricing is due **XX** days after the issue date noted on the left.

Project No.:
[Number]
Proposed Change No.:
[PC No.]

Description:
[Changes]

Issue Date:
[Date]

Owner:
[Owner Name]

Submitted by

Contractor's Proposal

By	Date	Cost
----	------	------

Recommended

By	Date
----	------

Owner's Authorization to Proceed

By	Date
----	------



350 N Saint Paul St #100
Dallas, TX 75201

HKS, Inc.
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Architect's Supplemental Instruction

To: (Contractor)
[Contractor]

Project & Address:
[Project Name & Address]

Project No.:
[Number]

ASI No.:
[Number]

Issue Date:
[Date]

Contract for:
[Contract for]

The work is to be executed in accordance with the supplemental instructions contained herein without change in Contract Time or Contract Sum. Before proceeding with these instructions return a copy to the architect indicating your acceptance of these instructions for minor change(s) to the work as consistent with the Contract Documents.

Description:
[Description]

Issued: HKS, Inc.

Architect

Date

Accepted

Contractor

Date

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Construction Change Directive

To:
[Contractor Name & Address]

You are directed to make the following change(s) in this Contract. Please respond with your pricing basis, amount and modification to the contract time within **XX** calendar days from the initiation date listed above.

Project & Address:
[Project Name & Address]

Description:
[Description]

Project No.:
[Number]
CCD No.:
[Number]

Proposed Modifications:

The proposed basis of modification to the Contract Sum or Guaranteed Maximum Price is:

Initiation Date:
[Date]
Contract for:
[Contract for]
Contract Date:
[Date]

- Guaranteed Maximum not to exceed: **\$XXX.XX**
- Lump Sum (increase)(decrease) of: **\$XXX.XX**
- Unit Price of: **\$XXX.XX**
- As provided in sub-paragraph 7.3.6 of AIA Document A201, 1997 edition.
- As follows:

The Contract time is proposed to (be modified)(remain unchanged).
The proposed modification, if any, is (an increase of **XX** days) (a decrease **XX** days).

XXX	XXX	XXX	XXX
Owner	Address	Signature	Date
HKS Inc.	XXX		XXX
Architect	Address	Signature	Date
XXX	XXX		XXX
Contractor	Address	Signature	Date

This document shall become effective immediately upon execution by the Owner and Architect.
The Contractor shall proceed with the changes described herein immediately upon receipt.

Execution by the Contractor is an indication of agreement with the modification in the Contract Sum and Contract Time indicated herein.

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SECTION 01 2900

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

- a. Application for Payment forms with continuation sheets.
- b. Submittal schedule.
- c. Accepted Alternates.

2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments; provide subschedules showing values coordinated with each phase of payment.

4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work; provide subschedules showing values coordinated with each element.

5. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract as described in Division 01 Section "Summary."

- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

- a. Project name and location.
- b. Name of Architect.
- c. Architect's project number.
- d. Contractor's name and address.
- e. Date of submittal.

2. Arrange the schedule of values in tabular form, in format accepted by Architect, with separate columns to indicate the following for each item listed:

- a. Related Specification Section or Division.

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- b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts, where appropriate.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance or bonded warehousing.
 6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Allowances (If Applicable): Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances (if applicable), as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 8. Alternates (If Applicable): Provide a separate line item in the schedule of values for each accepted alternate.
 9. Change Orders: Provide a separate line item in the schedule of values for each change order.
 10. Separate Owner-Consultant Contracts: Provide a separate line item in the schedule of values for each separate Owner-Consultant related Work item.
 11. Purchase Contracts: When applicable, provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
 12. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
 13. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

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1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
1. If the Agreement does not state payment dates, establish dates at preconstruction conference.
 2. Submit draft, or pencil, copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Unless directed otherwise by Owner, use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Stored Materials: If accepted by Owner, include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

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- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from General Contractor, subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
 - a. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. When applicable, this application shall reflect Certificate(s) of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

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3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. If applicable, final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. General coordination procedures.
 2. Coordination drawings.
 3. Requests for Information (RFIs).
 4. Project Web site.
 5. Project meetings.

1.2 DEFINITIONS

- A. Project communications documents shall be defined as the following:
1. Letters.
 2. Memoranda.
 3. E-Mail Communications/Internet Communications/Project Management Software Communications.
 4. RFI (Request for Information - Contractor).
 5. RFI-A (Request for Information - Architect).

1.3 FORMAT

- A. Letters and Memoranda: Submit in formats acceptable to the Architect.
- B. E-Mail Communications/Internet Communications/Project Management Software Communications: Submit in forms and formats acceptable to and as approved by the Architect.
- C. RFI (Request for Information - Contractor): Submit on forms furnished by the Architect, or on other forms as approved by the Architect. Unless otherwise approved use Architect's Form HKS-750, "Request for Information"; copy attached at the end of this Section.
- D. RFI-A (Request for Information - Architect), will be submitted by Architect to Contractor on Architects standard form.

1.4 PROJECT COMMUNICATIONS DOCUMENTS

- A. Letters and Memoranda documents shall be submitted in a timely manner so as to facilitate project delivery and coordination. Routing of communications shall be as established in the Contract, the Contract Documents and the Pre-Construction Conference. Communications documents shall be transmitted or forwarded in a manner consistent with the schedule and progress of the work.

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- B. E-Mail Communications, Internet Communications, and Project Management Software programs must be compatible with the Architect's and Owner's computer systems and equipment. The responsibility for all costs for management of these systems, including, but not limited to, licensing, onsite training or other training necessary for the proper operation of such systems, shall be by the Contractor. The Contractor shall keep written records and hard file copies of all electronic communications. Failure of the Contractor to keep such records shall waive the Contractor's right to rely on such communications and such communications shall be deemed to have not taken place.
- C. RFI (Request for Information - Contractor) shall be defined and limited to a request from the Contractor seeking interpretation or clarification of the requirements of the Contract Documents. Such requests shall comply with the following requirements:
1. RFI requests shall be submitted in a timely manner, well in advance of related work, and allow sufficient time for the resolution of issues relating to the request for interpretation or clarification. Contractor shall schedule the submission of RFI's so as to moderate and manage the flow of RFI requests. RFI's shall be submitted in a manner consistent with the schedule and progress of the work, and shall not be submitted in a sporadic and/or excessive manner.
 2. RFI requests shall be numbered in a sequential manner and contain a detailed description of the areas of work requiring interpretation or clarification. Include drawing and specification references, sketches, technical data, brochures, or other supporting data as deemed necessary by the Architect, for the Architect to provide the interpretations and clarifications requested.
 - a. The Contractor shall include a "Proposed Solution" to the issue requiring interpretation or clarification.
 3. RFI's submitted to the Contractor by Sub-Contractors, vendors, suppliers, or other parties to the work shall be reviewed by the Contractor prior to submission to the Architect. If the Architect deems that such RFI requests have not been adequately reviewed by the Contractor, such requests will be returned to the Contractor for further action. Sub-Contractor's RFI shall contain a "Proposed Solution".
 4. RFI requests shall not contain submittals, substitutions requests, routine communications, correspondence, memos, claims, or any information required by other areas of the Contract Documents. RFI requests containing such information will be returned to the Contractor without action by the Architect.
 5. RFI requests are limited to a request for interpretation or clarification of the requirements of the Contract Documents. Interpretations provided by the Architect shall not change the requirements of the Contract or the Contract Documents. If the Contractor determines that the Architect's response to an RFI gives cause for a change in the Contract or the Contract Documents, the Contractor shall promptly, within 5 working days, give written notice to the Architect of request for adjustments. Requests for adjustments to the Contract shall be submitted in a manner consistent with the terms and conditions of the Contract Documents.
 6. If the Architect, after review, determines that any RFI has been submitted in an incomplete manner, is unnecessary, or does not otherwise comply with the requirements of this Section, the RFI will be returned without action to the Contractor. The Contractor shall delete the original submittal date from the RFI log and enter a new submittal date at the time of re-submittal.
 7. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of Project Web site. Software log with not less than the following:

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- a. Project name.
 - b. Name and address of Contractor.
 - c. Name and address of Architect.
 - d. RFI number including RFIs that were returned without action or withdrawn.
 - e. RFI description.
 - f. Date the RFI was submitted.
 - g. Date Architect's response was received.
8. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- a. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- D. RFI-A (Request for Information - Architect) shall be defined as a request by the Architect for information relating to the obligations of the Contractor under the Contract.
1. After receipt of an RFI-A the Contractor shall provide a written response to the Architect within 5 working days. Responses shall be thorough, complete and shall contain all information requested by the Architect.
 2. An RFI-A shall be limited to a request by the Architect for information related to the project. The RFI-A shall not be construed as authorizing or directing a change in the Contract or the Contract Documents.
- E. Revisions to Construction Documents: Responses to requests for information (RFI) shall not serve as construction documents; and the Contractor shall not incorporate RFI responses into construction of the Project, unless such answers bear the seal and signature of a licensed design professional.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
1. Post copies of list in project meeting room, in temporary field office, and Project Web site. Keep list current at all times.

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1.6 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.7 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.

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- b. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - e. Indicate required installation sequences.
 - f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
 3. BIM File Incorporation: When applicable, develop coordination drawing files from Building Information Model (BIM) established for Project.
 - a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
 4. If approved by Owner, Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Digital Data Software Program: Drawings are available in Autodesk Revit and/or Autocad; and compatible with Microsoft Windows operating system.
 - c. Distribution: Digital data files shall only be distributed via the HKS Thru site with acceptance of HKS data licensing agreement.
- 1.8 PROJECT WEB SITE
- A. Use Architect's Project Web site implementing Architect's electronic project management software system for purposes of managing project communication and documentation until Final Completion.
 - B. Contractor, subcontractors, and other parties granted access to Project Web site shall execute a data licensing agreement in the form of AIA Document C106.
- 1.9 PROJECT MEETINGS
- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

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1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.
 4. Attendance: Document attendance of all participants.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, and coordination with adjacent activities. Prepare agenda appropriate to Work.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, at a time to be decided prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.

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- d. If applicable, requirements for completing sustainable design documentation.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Preparation of Contractor's punch list.
 - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - j. Submittal procedures.
 - k. If applicable, coordination of separate contracts.
 - l. If applicable, Owner's partial occupancy requirements.
 - m. Installation of Owner's furniture, fixtures, and equipment.
 - n. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at regular intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following or as needed:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) If applicable, resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) If applicable, status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site utilization.
 - 10) Temporary facilities and controls.
 - 11) Work hours.
 - 12) Hazards and risks.
 - 13) Progress cleaning.
 - 14) Quality and work standards.

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- 15) Status of correction of deficient items.
 - 16) Field observations.
 - 17) Status of RFIs.
 - 18) Status of proposal requests.
 - 19) Pending changes.
 - 20) Status of Change Orders.
 - 21) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- F. Coordination Meetings: Conduct Project coordination meetings on an as-needed basis. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: Each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) If applicable, resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Deliveries.
 - 6) Off-site fabrication.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Work hours.
 - 11) Hazards and risks.
 - 12) Progress cleaning.
 - 13) Quality and work standards.
 - 14) Change Orders.

PART 2 - PRODUCTS

2.1 ELECTRONIC PROJECT MANAGEMENT SOFTWARE

- A. General: So as to expedite electronic review process, process all documents through a web-based software service. Sending documents via email, FTP or paper will not be accepted.
1. Basis of Design (Product Standard):

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- a. Newforma, Inc.; Newforma Project Cloud, web-based software.
 - 1) Website: www.NewformaProjectCloud.com
 - 2) E-mail: projectcloud@newforma.com
 - 3) Phone: (800) 303-4650

B. Performance Requirements:

- 1. Project License:
 - a. Cloud based (no hardware required).
 - b. Unlimited user accounts.
 - c. Functionality to support subcontractors, contractors, architects and consultants.
 - d. Provide access to data for all project team members at no cost to the individual users.
- 2. Training and Support:
 - a. Dedicated project training.
 - b. Phone support.
- 3. Archive:
 - a. Export all data to an offline archive at the completion of the project.
 - b. Provide archive to architect, contractor and owner.
 - c. Archive shall include all attachments, meta data, review comments and time stamp history.
- 4. Submittals and RFIs:
 - a. Customizable logs and reporting accessible by all users.
 - b. Logs shall automatically update as submittals and RFIs are processed.
 - c. Automated routing of submittals and RFIs to design team based on trade.
 - d. Automated email notifications when submittal or RFI has been assigned or returned to a user.
 - e. Automated weekly email to design team users of overdue items.
 - f. Automatic sequential numbering per spec section for submittals.
 - g. Two sets of due dates - one overall due date and a consultant due date.
 - h. Built-in web-based markup tools to support a concurrent review of submittal and RFI.
- 5. Submittal Register:
 - a. Software vendor shall take specifications and build the required list of submittals and import into the software.
- 6. Drawing Management:
 - a. Provide current set of drawings and specifications through a centralized index.
 - b. Automated association of PDFs to the centralized index.
 - c. Manage drawing revisions with customizable review states.
 - d. Drawings shall be accessible offline via mobile devices.

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7. File Sharing:
 - a. Integrated file sharing tool (FTP) to transfer any miscellaneous files such as BIM and CAD files.
 - b. Access permissions (view/edit) at a folder level.

8. Punch List and other Field Task Management:
 - a. Unlimited customizable field task types including punch list.
 - b. Locate and assign tasks from a mobile device.
 - c. No additional fees to individual users to access mobile apps.
 - d. Data shall be accessible offline on mobile devices.

PART 3 - EXECUTION (Not Used)

END OF SECTION

Request for Information

Project:

[Project Name]

[Name]

Project No.:

[Number]

Sender

RFI No.:

[Number]

[Name]

Date Sent:

[Date]

Receiver

Date Initiated:

[Date]

[Name]

Date Response Requested:

[Date]

Copies to

Subject:

[Subject]

Request:

[Request]

Senders Proposed Answer/Solution:

[Answer/Solution]

THE PROPOSED ANSWER/SOLUTION IS, IS NOT, INCLUDED IN THE CONTRACT.

Receivers Response:

[Response]

[Name]

[Name]

[Name]

Sender

Sender

Sender

Distribution:

[Names]

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SECTION 01 3200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

- 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
- 2. Predecessor Activity: An activity that precedes another activity in the network.
- 3. Successor Activity: An activity that follows another activity in the network.

- B. Major Area: A story of construction, a separate building, or a similar significant construction element.

- C. Milestone: A key or critical point in time for reference or measurement.

1.3 SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:

- 1. PDF electronic file.

- B. Startup construction schedule.

- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

- D. Construction Schedule Updating Reports: Submit with Applications for Payment.

- E. Daily Construction Reports: Submit at weekly intervals.

- F. Material Location Reports: Submit at monthly intervals.

- G. Site Condition Reports: Submit at time of discovery of differing conditions.

- H. Special Reports: Submit at time of unusual event.

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1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 - 3. Startup and Testing Time: Include no fewer than 7 days for startup and testing.
 - 4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule (where applicable), and show how the sequence of the Work is affected.
 - 1. Phasing: Arrange list of activities on schedule by phase.
 - 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 - 3. Products Ordered in Advance: Include a separate activity for each product.
 - 4. Owner-Furnished Products: Include a separate activity for each product.
 - 5. Work Restrictions: Show the effect of the following items on the schedule:

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- a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
- a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Building flush-out.
 - m. Startup and placement into final use and operation.
7. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
8. Other Constraints include but are not limited to the following:
- a. Roads.
 - b. Parking.
 - c. Landscape.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, punch list activities, Substantial Completion, and final completion.
- E. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

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- F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 STARTUP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within 14 days of date established for the Notice of Award.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (BAR CHART/GANTT CHART)

- A. Bar Chart/Gantt Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. High and low temperatures and general weather conditions, including presence of rain or snow.
 - 5. Accidents.
 - 6. Meetings and significant decisions.
 - 7. Unusual events (see special reports).
 - 8. Stoppages, delays, shortages, and losses.
 - 9. Meter readings and similar recordings.
 - 10. Emergency procedures.
 - 11. Orders and requests of authorities having jurisdiction.
 - 12. Change Orders received and implemented.
 - 13. Construction Change Directives received and implemented.
 - 14. Services connected and disconnected.
 - 15. Equipment or system tests and startups.
 - 16. Partial completions and occupancies.
 - 17. Substantial Completions authorized.

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- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(±) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect-Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.2 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified photographer to take electronic construction photographs.
- B. Minimum Digital Camera Resolution: 1800 x 1200 dpi (dots per inch) @ 72 dpi resolution.

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- C. Acceptable Electronic File Format: .jpg, .tif, .tiff, .tga, .jpe., or .png.
- D. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
- E. Image File Naming Convention (separate by an underscore _):
1. Project Job Number / Year-Month-Day / Image Number . file extension
- F. Print Format: **8 in (200 mm)** by **10 in (250 mm)** smooth surface matte prints on single-weight commercial-grade stock, mounted on linen or card stock to allow a **1 in (25 mm)** wide margin and enclosed back to back in clear plastic sleeves that are punched for standard 3-ring binder.
- G. Print Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:
1. Name of Project.
 2. Name and address of photographer.
 3. Name of Architect.
 4. Name of Contractor.
 5. Date photograph was taken.
 6. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- H. Preconstruction Photographs: Before starting construction, take 4 photographs of Project site and surrounding properties from different vantage points, as directed by Architect. Show existing conditions adjacent to property. Submit prints and CD ROMs with digital files as required under "Submittals" Article.
- I. Periodic Construction Photographs: Take 4 photographs monthly, coinciding with cutoff date associated with each Application for Payment. Photographer shall select vantage points to best show status of construction and progress since last photographs were taken. Submit prints and CD ROMs with digital files as required under "Submittals" Article.
1. Field Office Prints: In addition to prints required to be submitted under "Submittals" Article, make and retain in field office at Project site available at all times for reference, one set of prints of periodic construction photographs. Identify photographs the same as for those submitted to Architect.
- J. Final Completion Construction Photographs: Take 8 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will direct photographer for desired vantage points. Submit prints and CD ROMs with digital files as required under "Submittals" Article.

END OF SECTION

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SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's review. Architect's responsive action is required.
- B. Digital Signature: A digital signature or digital signature scheme is a mathematical scheme for demonstrating the authenticity of a digital message or document.
- C. Electronic Signature: An electronic signature is any legally recognized electronic means that indicates that a person adopts the contents of an electronic message.
- D. Informational Submittals: Written and graphic information other than action submittals that require Architect's review. Architect's responsive action is required on informational submittals that do not comply with the information given and design concept expressed in the Drawings and Specifications.
- E. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

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4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: If approved by Owner, Architect will furnish Contractor one set of digital data files of Drawing files for use in preparing submittals. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 1. Distribution: Digital data files shall only be distributed via the HKS Thru site with acceptance of HKS data licensing agreement.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow sufficient and reasonable time for submittal review, including time for resubmittals. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 1. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review.
- D. Paper Submittals: Architect reserves the right to require paper submittals.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number, including revision identifier.

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- a. File Naming Convention (separate by dashes - or underscores _):
 - 1) Specification Number / Revision Number / Submittal Sequence (A, B, C, etc.).pdf
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
 4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software or electronic form acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Names of subcontractor, manufacturer, and supplier.
 - g. Category and type of submittal.
 - h. Submittal purpose and description.
 - i. Specification Section number and title.
 - j. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Indication of full or partial submittal.
 - o. Transmittal number, numbered consecutively.
 - p. Submittal and transmittal distribution record.
 - q. Other necessary identification.
 - r. Remarks.
 5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
 - a. HKS Job Number and Add Service Number (e.g. 14424.000)
 - b. Project name.
 - c. Number and title of appropriate Specification Section.
 - d. Manufacturer name.
 - e. Product name.
 - f. Submittal revision number.
 6. Utilize electronic project management software program to process submittals when feasible with the type and extent of submittals. Refer to Division 01 Section "Project Management and Coordination" for description of electronic project management software.
- F. Options: Identify options requiring selection by Architect.
- G. Deviations and Additional Information: On page, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

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- H. Resubmittals: Make resubmittals in same form as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in file name and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with notation from Architect's action stamp not requiring additional submittals.
- I. Distribution: Furnish electronic copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with appropriate notation from Architect's action stamp indicating for construction. Retain a separate copy for Owner to be delivered to Owner with Project Closeout documents.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Submit electronic submittals as PDF electronic files directly to Architect's Project Web site specifically established for Project.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 - b. Provide PDF electronic files from scanned paper originals at 300 dpi, minimum.
 - 2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. When one or more individual Specification Sections includes requirements for notarized signature on certificates and certifications, provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's installation instructions.

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- c. Mill reports.
 - d. Standard product operating and maintenance manuals.
 - e. Certification that products are appropriate for installation indicated.
 - f. Manufacturer's catalog cuts.
 - g. Manufacturer's product specifications.
 - h. Standard color charts.
 - i. Statement of compliance with specified referenced standards.
 - j. Testing by recognized testing agency.
 - k. Application of testing agency labels and seals.
 - l. Notation of coordination requirements.
 - m. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
- a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:
- a. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Dimensions.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Design calculations.
 - i. Schedules.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship and attachment to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer.
 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (212 by 275 mm), but no larger than 30 by 42 inches (750 by 1050 mm).
 4. Submit Shop Drawings in the following format:

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- a. PDF electronic file.
5. BIM File Incorporation: When applicable, develop and incorporate Shop Drawing files into Building Information Model established for Project.
- a. Prepare Shop Drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.
 - b. Refer to Division 01 Section "Project Management and Coordination" for requirements for coordination drawings.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record. This is in addition to physical samples.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit 4 full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

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- a. Number of Samples: Submit 4 sets of Samples. Architect will retain 2 Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least 4 sets of paired units that show approximate limits of variations.
- E. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- G. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
- J. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- K. Sustainable Construction Submittals: Where applicable, comply with requirements specified in Division 01 sustainable construction requirements Section.
- L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

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- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
 2. Date of evaluation.
 3. Time period when report is in effect.
 4. Product and manufacturers' names.
 5. Description of product.
 6. Test procedures and results.
 7. Limitations of use.
- U. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- V. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- W. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-ENGINEERING SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

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- B. Delegated-Engineering Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C. BIM File Incorporation: Where applicable, incorporate delegated-design drawing and data files into Building Information Model established for Project.
 - 1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp and mark submittal appropriately, as follows:
 - 1. Final but Restricted Release: When submittals are marked "Accepted as Noted," the Work covered by the submittal may proceed provided it complies with both the Architect's notations and corrections on the submittal and requirements of the Contract Documents. Final acceptance will depend on that compliance.
 - 2. Returned for Resubmittal: When submittal is marked "Revise Resubmit," do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the Architect's notations. Resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Revise Resubmit" to be used at the Project site, or elsewhere where construction is in progress.
 - 3. Submittals Not Required: Where a submittal is primarily for other Contractor activity, the submittal will be returned, marked "Not Reviewed; Submittal not required by Contract Documents".

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- B. Architect's acceptance of Shop Drawings, Samples or Product Data which deviates from the Contract Documents does not authorize changes to the Contract Sum. Submit in writing at the time of submission any changes to the Contract Sum affected by such Shop Drawings, Samples or Product Data, otherwise, claim for extras will not be considered.
- C. Informational Submittals: Architect will review submittal, and return it in accordance with submittal Processing Time indicated if it does not comply with requirements. Architect will stamp and mark submittal appropriately.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect. Review shall not be final until complete submittal has been reviewed by Architect.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- F. Submittals not required by the Contract Documents may be returned by the Architect without action.
- G. Electronic File of Submittal Documents: Provide Architect with an independent electronic archive of project submittal documents using electronic project management software as defined in Division 01 Section "Project Management and Coordination".

END OF SECTION

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SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Mockups establish the standard by which the Work will be judged.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL (Nationally Recognized Testing Laboratories), an NVLAP (National Voluntary Laboratory Accreditation Program), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

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- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction and with the qualification requirements of individual specification section governing their work.

1.3 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
- C. If work is required in a manner that makes it impossible to produce such work of the quality required by or reasonably inferred from the Contract Documents, or should discrepancies appear among the Construction Documents, the Contractor shall request in writing an interpretation from the Architect before proceeding with the work. If the Contractor fails to make such request, no excuse will be entertained thereafter for failure to carry out work in the required manner or to produce required guarantees, warranties, or bonds, and the Contractor shall not be entitled to any change in the Contract Sum or the Contract Time on account of such failure.

1.4 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

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- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may be the Project superintendent or be an individual with no other Project responsibilities, as accepted by the Architect.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
 - 3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority when Commissioning is included in the Project.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results, including Owner acceptance of nonconforming work. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.5 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

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12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Statement whether conditions, products, and installation exceed manufacturer's statements.
 8. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- 1.6 QUALITY ASSURANCE
- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

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- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.

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2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mock-ups: Prior to fabrication and installation, build mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up to comply with the following requirements, using materials indicated for the completed Work:
1. Build mock-up in the location and of the size indicated or, if not indicated, as directed by Architect. Contractor shall provide structural support framework.
 - a. Show typical components, attachments to building structure, and requirements of installation.
 2. Clean exposed faces of mock-up.
 3. Notify Architect seven days in advance of the dates and times when mock-up will be installed.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Protect accepted mock-up from the elements with weather-resistant membrane.
 6. Obtain Architect's acceptance of mock-ups before starting fabrication.
 7. Maintain mock-ups during construction in an undisturbed condition as a standard for review of the completed Work.
 8. Acceptance of mock-ups does not constitute acceptance of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically noted by Contractor, submitted to Architect in writing, and accepted by Architect in writing.
 9. Demolish and remove mock-ups when directed by Architect unless accepted to become part of the completed Work.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

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3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.

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- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule.
 - 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
 - a. Prepare in tabular form and include the following:
 - 1) Specification Section number and title.
 - 2) Entity responsible for performing tests and inspections.
 - 3) Description of test and inspection.
 - 4) Identification of applicable standards.
 - 5) Identification of test and inspection methods.
 - 6) Number of tests and inspections required.
 - 7) Time schedule or time span for tests and inspections.
 - 8) Requirements for obtaining samples.
 - 9) Unique characteristics of each quality-control service.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner may engage a qualified to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
 - 1. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 2. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 - 3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 5. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.

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2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

- B. Protect construction exposed by or for quality-control service activities.

- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

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SECTION 01 4200

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. Submitted: The terms "submitted", "reported", "satisfactory" and similar words and phrases means submitted to Architect, reported to Architect and similar phrases.
- J. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

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- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO International Association of Plumbing and Mechanical Officials
www.iapmo.org

ICC International Code Council
www.iccsafe.org

ICC-ES ICC Evaluation Service, Inc.
www.icc-es.org

UBC Uniform Building Code
(See ICC)

- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE Army Corps of Engineers
www.usace.army.mil

CPSC Consumer Product Safety Commission
www.cpsc.gov

DOC Department of Commerce
www.commerce.gov

DOD Department of Defense
<http://.dodssp.daps.dla.mil>

DOE Department of Energy
www.energy.gov

EPA Environmental Protection Agency
www.epa.gov

FAA Federal Aviation Administration

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	www.faa.gov
FCC	Federal Communications Commission www.fcc.gov
FDA	Food and Drug Administration www.fda.gov
GSA	General Services Administration www.gsa.gov
HUD	Department of Housing and Urban Development www.hud.gov
LBL	Lawrence Berkeley National Laboratory www.lbl.gov
NCHRP	National Cooperative Highway Research Program (See TRB)
NIST	National Institute of Standards and Technology www.nist.gov
OSHA	Occupational Safety & Health Administration www.osha.gov
PBS	Public Buildings Service (See GSA)
PHS	Office of Public Health and Science www.osophs.dhhs.gov/ophs
RUS	Rural Utilities Service (See USDA)
SD	State Department www.state.gov
TRB	Transportation Research Board http://gulliver.trb.org
USDA	Department of Agriculture www.usda.gov
USPS	Postal Service www.usps.com

- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
- ADAAG Americans with Disabilities Act (ADA)

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Architectural Barriers Act (ABA)
Accessibility Guidelines for Buildings and Facilities
Available from U.S. Access Board
www.access-board.gov

- CFR Code of Federal Regulations
Available from Government Printing Office
www.gpoaccess.gov/cfr/index.html
- DOD Department of Defense Military Specifications and Standards
Available from Department of Defense Single Stock Point
<http://dodssp.daps.dla.mil>
- DSCC Defense Supply Center Columbus
(See FS)
- FED-STD Federal Standard
(See FS)
- FS Federal Specification
Available from Department of Defense Single Stock Point
<http://dodssp.daps.dla.mil>
- Available from Defense Standardization Program
www.dps.dla.mil
- Available from General Services Administration
www.gsa.gov
- Available from National Institute of Building Sciences
www.wbdg.org/ccb
- FTMS Federal Test Method Standard
(See FS)
- MIL (See MILSPEC)
- MIL-STD (See MILSPEC)
- MILSPEC Military Specification and Standards
Available from Department of Defense Single Stock Point
<http://dodssp.daps.dla.mil>
- UFAS Uniform Federal Accessibility Standards
Available from Access Board
www.access-board.gov

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

- 1. Cost or use charges for temporary facilities are not chargeable to Owner or Architect.

- B. Sewer Service: Pay sewer-service use charges for sewer usage, indicated by utility company meter readings, by all entities for construction operations.

- C. Water Service: Pay water-service use charges for water used, indicated by utility company meter readings, by all entities for construction operations.

- D. Electric Power Service: Pay electric-power-service use charges for electricity used, indicated by utility company meter readings, by all entities for construction operations.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show required contractor temporary office square footage, staging areas, and parking areas for construction personnel.

- B. Dust- and HVAC-Control Plan at Renovation Work: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

- 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6 "Requirements for Demolition Operations", NECA's "Temporary Electrical Facilities," and NFPA 241 "Standard for Safeguarding Construction, Alteration, and Demolition Operations".

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1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
 - B. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
 - C. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
 - D. Accessible Temporary Egress at Renovation Work: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
 - E. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to, the following:
 1. Building Code requirements.
 2. Health and safety regulations.
 3. Utility company regulations.
 4. Police, Fire Department and Rescue Squad rules.
 5. Environmental protection regulations.
 6. City ordinances and regulations.
- 1.5 PROJECT CONDITIONS
- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Materials and equipment may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.
- C. Chain-Link Fencing: Minimum 2 inch (50 mm), 0.148 inch (3.8 mm) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8 inch (60 mm) OD line posts and 2-7/8 inch (73 mm) OD corner and pull posts, with 1-5/8 inch (42 mm) OD top rails.
- D. Portable Chain-Link Fencing: Minimum 2 inch (50 mm), 0.148 inch (3.8 mm) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8 inch (60 mm) OD line posts and 2-7/8 inch (73 mm) OD corner and pull posts, with 1-5/8 inch (40 mm) OD top and bottom rails. Provide concrete or galvanized-steel bases for supporting posts.

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- E. Wood Enclosure Fence: Plywood, 8 feet (2.4 m) high, framed with four 2 by 4 inch (50 by 100 mm) rails, with preservative-treated wood posts spaced not more than 8 feet (2.4 m) apart.
- F. Polyethylene Sheet: Reinforced, fire-resistive sheet, 6 mil (0.14 mm) minimum thickness, with Class A flame-spread rating per ASTM E 84 and passing NFPA 701 Test Method 2.
 - 1. Basis of Design (Product Standard): Abatement Technologies, Inc.; SAFE-FLEX ICRA Awareness Barrier.
- G. Dust Containment Barrier for Doors: reinforced, fire-resistive polyethylene sheet, 10 mil (0.25 mm) minimum thickness with Class B flame-spread rating per ASTM E 84 and designed to be used for securing temporary construction doors so as to minimize and mitigate particle control during construction.
 - 1. Basis of Design (Product Standard): Abatement Technologies, Inc.; Aire Guardian Door Guard Reusable Barrier.
- H. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (900 by 1500 mm).
- I. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- C. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

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- D. Air-Filtration Units for Renovation Work: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Existing Toilets in Occupied Facilities: Owner will designate existing toilet for construction use.
- B. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- C. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

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- D. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
- E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
- F. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Provide telephone line(s) for each field office.
- G. Electronic Communication Service: Provide internet access of not less than 15-Mbps download and 5-Mbps upload speed for use by Architect and Owner to access Project electronic documents and maintain electronic communications

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Parking: Coordinated parking with Owner's requirements.
- C. Project Signs: Coordinated signs with Owner's requirements and requirements of authorities having jurisdiction.
- D. Comply with progress cleaning requirements in Division 01 Section "Execution."
- E. Existing Stair Usage in Occupied Facilities: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- F. Existing Elevator Use in Occupied Facilities: Use of Owner's existing service elevator will be permitted, provided the elevator is cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevator to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 - 1. Do not load elevator beyond its rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevator becomes damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

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3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- C. Temporary Enclosures: Provide temporary, weathertight, enclosures for protection of construction, in progress and completed, including, but not limited to, vertical and horizontal openings, from exposure, foul weather, other construction operations, and similar activities.
- D. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Construct dustproof partitions with two layers of 6 mil (0.14 mm) polyethylene sheet on each side. Cover floor with two layers of 6 mil (0.14 mm) polyethylene sheet, extending sheets 18 inches (450 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1200 mm) between doors. Maintain walk-off mats in vestibule, for dust control.
 - 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 5. Protect air-handling equipment.
 - 6. Provide walk-off mats at each entrance through temporary partition.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241 and authorities having jurisdiction; manage fire-prevention program.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. If temporary facilities are needed, maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

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- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor.
 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

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SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, and equipment from those required by the Contract Documents and proposed by Contractor. Refer to Division 01 Section "Substitution Procedures".
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "Product Standard," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other manufacturers
- D. Hazardous Substances Prohibited by Law: Including, but not limited to, any product, material, element, constituent, chemical, substance, compound, or mixture, which is defined in, included under, or regulated by any environmental laws.
- E. Environmental Laws: Applicable local, state, and federal laws, rules, ordinances, codes, regulations, and requirements in effect at the time Contractor's services are rendered, any amendments for Contractor's services rendered after the effective date of any such amendments.

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1.3 SUBMITTALS

- A. Comparable Product: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements. Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.
- C. Contractor shall submit an affidavit on construction company letterhead signed by an officer of the company, notarized by a notary public, which certifies compliance with the environmental laws controlling hazardous substances for the construction of this Project.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Compliance: Contractor shall take whatever measures deemed necessary to insure that all employees, suppliers, vendors, fabricators, subcontractors, or their assigns, to comply with hazardous substance requirements.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

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6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product, required by the Contract Documents to provide specific rights for Owner, and specifically endorsed by manufacturer to Owner.
 2. Warranties: Prepare a written document, on manufacturer's standard form, modified to include Project-specific information, that contains appropriate terms and identification, properly executed.
- B. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Products and materials brought onto the Project Site, and products and materials incorporated into the Work, shall comply with environmental laws.
- B. Product Selection Procedures:
 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 3. Products:

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- a. Restricted List (Acceptable Manufacturers/Fabricators and Products): Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - b. Nonrestricted List (Available Manufacturers/Fabricators and Products): Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
4. Manufacturers:
- a. Restricted List (Acceptable Manufacturers/Fabricators): Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - b. Nonrestricted List (Available Manufacturers/Fabricators): Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
5. Basis-of-Design Product (Product Standard): Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers, or unnamed manufacturer's product.
- C. Descriptive Specification Requirements: Where Specifications describe a product, or assembly, listing exact characteristics required, without use of a brand or trade name, provide a product, material or assembly that provides the characteristics and otherwise complies with Contract requirements.
- D. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product or material is specified for a specific application.
1. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.
- E. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with imposed code, standard or regulation, select product that complies with standards, codes or regulations specified.
- F. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

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1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.
- G. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's color, gloss, pattern, density, or texture" or similar phrase, select a product (and manufacturer) that complies with other specified requirements.
1. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
 2. Custom Range: Where Specifications include the phrase "custom range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.
 3. Special Custom Range: Where Specifications include the phrase "special custom range of colors patterns, textures" or similar phrase, Architect will select a new color, pattern, or texture different from those normally produced by the manufacturer.
- H. Allowances (If Applicable): Refer to provisions of individual Specification Sections and of Division 01 Section "Allowance" for allowances that control product selection and for procedures required for processing such selections.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents; that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

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PART 3 - EXECUTION

3.1 RESTRICTION OF HAZARDOUS SUBSTANCES

- A. Contractor agrees that it shall not knowingly after reasonable diligence and effort, incorporate into the Work any hazardous substance other than as may be lawfully contained within products, except in accordance with applicable environmental laws. Further, in performing any of its obligations hereunder, Contractor shall not cause any release of hazardous substances into, or contamination of, the environment, including soil, the atmosphere, any watercourse or ground water, except in accordance with applicable environmental laws. In the event that Contractor engages in any of the activities prohibited in this paragraph, to the fullest extent permitted by law, Contractor hereby indemnifies and holds harmless Owner and its partners, members, officers, directors, agents, employees and consultants from and against any and all claims, damages, losses, causes of action, suits and liabilities of every kind, including, but not limited to, expenses of litigation, court costs, punitive damages and attorney's fees, arising out of, incidental to or resulting from the activities prohibited.
- B. In the event Contractor observes on the Project Site any substance which Contractor reasonably believes to be a hazardous substance, and which is being introduced into the Work, or exists on the Project Site, in a manner violative of any applicable environmental laws, Contractor shall immediately notify Owner and report the condition to Owner in writing. The Work in the affected area shall not thereafter be resumed except by written authorization of Owner if in fact a hazardous substance has been encountered and has not been rendered harmless. In the event that Contractor fails to give Owner proper notification hereunder, upon knowingly observing a hazardous substance at the Project Site, to the fullest extent permitted by the law, Contractor hereby indemnifies and holds harmless Owner, and all of its partners, members, officers, directors, agents, employees and consultants from and against all claims, damages, losses, causes of action, suits and liabilities of every kind, including, but not limited to, expenses of litigation, court costs, punitive damages and attorneys' fees, arising out of, incidental to, or resulting from Contractor's failure to stop the Work.
- C. If Owner believes that hazardous substances may have been located, generated, manufactured, used or disposed of on or about the Project Site by Contractor or any of its employees, agents, subcontractors, suppliers, or invitees, Owner may have environmental studies of the Project Site conducted as it deems appropriate, and Contractor shall be responsible for the cost of such studies to the extent that Contractor or any of its employees, agents, subcontractors, suppliers or invitees are responsible for the presence of any hazardous substances.

END OF SECTION

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SECTION 01 7300

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.3 SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.

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7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 1. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 3. Miscellaneous Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - a. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Division 01 sustainable construction requirements Section.

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- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. Respective manufacturer/fabricator's written installation instructions.
 - 2. Accepted submittals.
 - 3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

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- B. Existing Utility Interruptions at Renovation Work: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than 72 hours in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
- C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated, unless indicated otherwise in the Contract Documents.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

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- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located, aligned, and coordinated with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

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1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 5. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - b. Patch fire rated assemblies with materials to match existing and maintain assembly fire rating.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: As applicable, provide access to Project site for Owner's construction personnel.

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- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers specifically intended for holding types of waste materials identified where applicable, e.g. blue colored containers with labeling and symbols for bio-waste.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills immediately.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."

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- H. Remove construction markings not required and graffiti immediately, repairing or replacing damaged material.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. As applicable, coordinate startup and adjusting of equipment and operating components with commissioning requirements in Division 01 specification sections.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

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SECTION 01 7419.13

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Diversion: Avoidance of demolition and construction waste sent to landfill or incineration. Diversion does not include using materials for landfill, alternate daily cover on landfills, or materials used as fuel in waste energy processes.
- E. Material Stream: A flow of materials coming from a job site into markets for building materials. Examples of material streams include deconstructed materials sent to reuse markets, commingled waste sent to mixed-waste recycling facility, source separation where each material is sent to a specific facility, manufacturers' or suppliers' take-back of materials, and reuse of deconstructed materials on-site.
- F. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- G. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- H. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- I. Source Separation: The act of keeping different types of waste materials separated starting at the first instance a material is considered waste.

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1.3 MATERIALS OWNERSHIP

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

1.4 SUBMITTALS

- A. Waste Management Plan: Submit plan within 14 days of date established for commencement of the Work.

- B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons (tonnes).
4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

- C. Qualification Data: For waste management coordinator and refrigerant recovery technician.

1.5 QUALITY ASSURANCE

- A. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.6 WASTE MANAGEMENT PLAN

- A. General: Develop and implement a Construction Waste Management Plan (CWMP) consisting of waste identification, waste reduction work plan, waste diversion goal, whether separated or comingled and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume but use the same units of measure throughout the CWMP.

- B. Waste Identification: Indicate anticipated types and quantities of waste generated by the Work. Include estimated quantities and assumptions for estimates.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Achieve end-of-Project rates for salvage/recycling nonhazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials for the following.
 - 1. Demolition Waste:
 - a. Landscape Debris and Soil: Do not include as part of demolition waste quantities.
 - 2. Construction Waste:
 - a. Divert 50% by weight or higher when mandated by local ordinance.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Division 1 Section "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
 - 1. Periodic Observations: Contractor's qualified waste management coordinator shall periodically inspect waste collection bins to ensure collection is proceeding in accordance with requirements.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to everyone concerned.
 - 2. Distribute waste management plan to entities when they begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, or sold.
 - 2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

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3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
1. Not allowed unless noted otherwise.
 2. Clean, repair, service, and refinish salvaged items, unless noted otherwise.
 3. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 4. Store items in a secure area until installation.
 5. Protect items from damage during transport and storage.
 6. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.

3.3 RECYCLING WASTE, GENERAL

- A. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 4. Store components off the ground and protect from the weather.

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5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

- A. General: Grind, chip, separate, sort, stack and store as necessary to process waste material.

3.5 RECYCLING CONSTRUCTION WASTE

- A. General: Grind, crush, remove reinforcing and metals, separate, sort, stack and store as necessary to process waste materials

- B. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

- C. Wood Materials:

1. Lumber Treated with Heavy-Metal Preservatives: Do not grind, chip, or incinerate; must be reused or landfilled.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

- B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.

- C. Burning: Do not burn waste materials.

- D. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

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SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Substantial Completion procedures.
 2. Final completion procedures.
 3. Warranties.
 4. Final cleaning.
 5. Repair of the Work.

1.2 SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.
- C. Certificates of Release: From authorities having jurisdiction.
- D. Certificate of Insurance: For continuing coverage.
- E. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Divisions 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

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4. Submit maintenance material submittals specified in individual Divisions 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
 5. Submit test/adjust/balance records.
- C. Procedures Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training."
 6. Advise Owner of changeover in heat and other utilities.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements, including touchup painting.
 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request, in writing, reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.
- E. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.
- 1.4 FINAL COMPLETION PROCEDURES
- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

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1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list). Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
- 1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)
- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the format agreed upon by the Owner and Architect.
- 1.6 SUBMITTAL OF PROJECT WARRANTIES
- A. Time of Submittal: Submit written warranties for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within minimum number days, as required by the Contract, of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

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1. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations, as applicable, before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

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- j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Remove all graffiti and construction writing.
 - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - r. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."
- 1. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace all lamps and starters to comply with requirements for new fixtures.

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C. All Warranties remain in effect.

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SECTION 01 7823

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
- B. Format: Submit operations and maintenance manuals in the following format:
1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Owner.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and before commencing demonstration and training. Architect will return copy with comments.
1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual prior to commencing demonstration and training.

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PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Architect.
 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

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1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 1. Instructions on stopping.
 2. Shutdown instructions for each type of emergency.
 3. Operating instructions for conditions outside normal operating limits.
 4. Required sequences for electric or electronic systems.
 5. Special operating instructions and procedures.

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2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

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- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.

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- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

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- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."
- F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

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SECTION 01 7839

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
1. Record Drawings.
 2. Record Specifications.
 3. Record Product Data.
 4. Miscellaneous record submittals.

1.2 SUBMITTALS

- A. Record Drawings: Comply with the following:
1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit PDF electronic files of scanned record.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit-annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.1 ELECTRONIC PROJECT MANAGEMENT SOFTWARE

- A. Electronic File of Project Record Documents: Provide Architect with an independent electronic archive of accepted project record documents using electronic project management software as defined in Division 01 Section "Project Management and Coordination", in addition to the printed documents described elsewhere in this Section.

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2.2 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.3 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

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3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders, record Product Data, and record Drawings where applicable.

- B. Format: Submit record Specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.4 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

- B. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.

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

2.5 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

- B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

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

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

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END OF SECTION

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SECTION 01 7900

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.2 SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products.
- B. Qualification Data: For instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.3 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- B. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

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1.4 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.

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- f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
- a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

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PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner with at least seven days' advance notice.
- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION

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SECTION 01 8116.16

CONSTRUCTION REQUIREMENTS FOR VOCs

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Volatile Organic Compound (VOC) limits for adhesives, sealants, paints and coatings.

1.2 DEFINITIONS

- A. CDPH Standard Method: California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, v. 1.1-2010 or current version, for the emissions testing and requirements of products and materials.
- B. Volatile Organic Compounds (VOC) Emissions Test: Refer to CDPH Standard Method v1.1 definition.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for interior applied adhesives, sealants, paints and coatings indicating VOC content in grams/Liter (g/L).
 - 1. Include Certifications by manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and General Emissions Requirements indicated in this Section.

PART 2 - PRODUCTS

2.1 VOLATILE ORGANIC COMPOUND (VOCs) LIMITS

- A. General Emissions Requirements: Products must demonstrate they have been tested and determined compliant in accordance with California Department of Public Health, (CDHP), Standard Method, version indicated, using the applicable exposure scenario. Manufacturer's documentation demonstrating compliance must state the range of Total VOCs (TVOC) after 14 days measured as specified in the CDPH Standard Method CATEGORIES as follows:
 - 1. 0.5mg/m³ or less,
 - 2. Between 0.5 and 5.0 mg/m³ or,
 - 3. 5.0 mg/m³ or more.

2.2 PAINTS AND COATINGS

- A. Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits

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1. Air Quality Resources and Management: Use only paints and coatings that comply with the limits for VOC content when calculated according to the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.

2.

Product Type	Allowable VOC Content (g/L)
Bond Breaker	350
Clear wood finishes - Varnish	275
Clear wood finishes - Sanding Sealer	275
Clear wood finishes - Lacquer	275
Colorant - Architectural Coatings, excluding IM coatings	50
Colorant - Solvent Based IM	600
Colorant - Waterborne IM	50
Concrete - Curing compounds	100
Concrete - Curing compounds for roadways & bridges	350
Concrete surface retarder	50
Driveway Sealer	50
Dry-fog coatings	50
Faux finishing coatings - Clear topcoat	100
Faux finishing coatings - Decorative Coatings	350
Faux finishing coatings - Glazes	350
Faux finishing coatings - Japan	350
Faux finishing coatings - Trowel applied coatings	50
Fire-proof coatings	150
Flats	50
Floor coatings	50
Form release compounds	100
Graphic arts (sign) coatings	150
Industrial maintenance coatings	100
Industrial maintenance coatings - High temperature IM coatings	420
Industrial maintenance coatings - Non-sacrificial anti-graffiti coatings	100
Industrial maintenance coatings - Zinc rich IM primers	100
Magnesite cement coatings	450
Mastic coatings	100
Metallic pigmented coatings	150
Multi-color coatings	250
Non-flat coatings	50
Pre-treatment wash primers	420
Primers, sealers and undercoaters	100
Reactive penetrating sealers	350
Recycled coatings	150
Roof coatings	50
Roof coatings, aluminum	100

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Roof primers, bituminous	350
Rust preventative coatings	100
Stone consolidant	450
Sacrificial anti-graffiti coatings	50
Shellac- Clear	730
Shellac - Pigmented	550
Specialty primers	100
Stains	100
Stains, interior	250
Swimming pool coatings - repair	340
Swimming pool coatings - other	340
Traffic Coatings	100
Waterproofing sealers	100
Waterproofing concrete/masonry sealers	100
Wood preservatives	350
Low solids coatings	120

2.3 ADHESIVES AND SEALANTS

A. Adhesives and Sealants: For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Air Quality and Resources Management: For field applications that are inside the weatherproofing system, use adhesives and sealants that comply with the limits for VOC content when calculated according to South Coast Air Quality Management District (SCAQMD) Rule #1168, requirements in effect on October 6, 2017:
- 2.

Architectural Applications	Allowable VOC Content (g/L)
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesives	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Dry wall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single ply roof membrane adhesives	250
Specialty Applications:	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550

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Computer diskette manufacturing	350
Contact adhesive	80
Special purpose contact adhesive	250
Tire retread	100
Adhesive primer for traffic marking tape	150
Structural wood member adhesive	140
Sheet applied rubber lining operations specialty	250
Top and Trim adhesive	250
Substrate Specific Applications:	
Metal to metal substrate specific adhesives	30
Plastic foam substrate specific adhesives	50
Porous material (except wood) substrate specific adhesives	50
Wood substrate specific adhesives	30
Fiberglass substrate specific adhesives	80
Sealants:	
Architectural sealant	250
Marine deck sealant	760
Nonmember roof sealant	300
Roadway sealant	250
Single-ply roof membrane sealant	450
Other sealant	420
Sealant Primers:	
Architectural non-porous sealant primer	250
Architectural porous sealant primer	775
Modified bituminous sealant primer	500
Marine deck sealant primer	760
Other sealant primer	750
Other:	
Other adhesives, adhesive bonding primers, adhesive primers or any other primers	250

- a. Exception: The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 02 4119

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes selective removal and subsequent offsite disposal of portions of existing building indicated on drawings and as required to accommodate new construction.

1.2 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 and deliver them to Owner's designated storage area.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Locations of temporary partitions and means of egress.
 - 6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- B. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.
- C. Predemolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

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1.5 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Professional Engineer Qualifications: Professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of kind indicated for demolitions similar to this Project and has a record of successful in-service performance
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Comply with applicable regulations, codes and ordinances.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.
- E. Proposed Dust-Control and Noise-Control Measures: Written statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- F. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.6 PROJECT CONDITIONS

- A. Occupied Buildings:
 - 1. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
 - 2. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- B. Owner assumes no responsibility for condition of areas to be selectively demolished. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
- C. Hazardous Materials: If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- D. Storage or sale of removed items or materials on-site will not be permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

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1. Maintain fire-protection facilities in service during selective demolition operations.

1.7 WARRANTY

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

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Engage a professional engineer to survey 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 demolition operations.
- F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES

- A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

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- B. Occupied Buildings: Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
 - 1. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
- C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - 1. Arrange with Owner to shut off indicated utilities.
 - 2. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - 3. Protect existing site improvements, appurtenances, and landscaping to remain.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furnishings, and equipment that have not been removed.
- C. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

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- D. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- E. Temporary Shoring: Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. Strengthen or add new supports when required during progress of selective demolition.

3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
 - 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
 - 2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: 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.

3.5 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. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.
 - 3. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 4. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 5. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, verify condition and contents before starting flame-cutting operations.
 - 6. Maintain portable fire-suppression devices during flame-cutting operations.
 - 7. Maintain adequate ventilation when using cutting torches.
 - 8. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 9. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

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10. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 11. Dispose of demolished items and materials promptly.
 12. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- B. Existing Facilities: Comply with building manager's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
- C. Removed and Salvaged Items: Comply with the following:
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: Comply with the following:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
 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 Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.6 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
1. Completely fill holes and depressions in existing concrete or masonry that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

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3.8 SELECTIVE DEMOLITION SCHEDULE

- A. Refer to the drawings.

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SECTION 03 0150

CONCRETE PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work required for this section includes non-structural concrete patching and supplementary items necessary to complete their installation.

1.2 ACTION SUBMITTALS

- A. Product Data: Submit copies of manufacturers' technical literature for specified products. Submittal(s) shall identify location(s) of Contractor's intended application of product(s).
 - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.

1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturer(s) Project Acceptance Document: Certification by the manufacturer that its product(s) are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that a warranty will be issued.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.
 - 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.
- B. Fire Rated Assemblies: Perform patching of fire rated assemblies using materials and procedures to maintain fire rating of existing assembly.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply patching and repair material when air and substrate temperatures are outside limits permitted by manufacturer.
- B. Hot-Weather Requirements: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as recommended by manufacturer.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".

2.2 MATERIALS, GENERAL

- A. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

2.3 MATERIAL

- A. Epoxy-Resin Bonding Adhesives: ASTM C 881, Type II.
1. Suitable for use on dry or damp surfaces.
 2. Epoxy Adhesive for Bonding Plastic Concrete to Hardened Concrete: Conform to requirements of ACI 503.2-92 (R97), unless modified herein.
 3. Epoxy Adhesive for Bonding Hardened Concrete, Steel, Wood, Brick, and other Materials to Hardened Concrete: Conform to requirements of ACI 503.1-92 (R97), unless modified herein.
 4. Manufacturers:
 - a. BASF
 - b. Euclid Chemical Company
 - c. Sika Corporation
 - d. W.R. Meadows
- B. Latex Bonding Agents, Admixtures, and Adhesives: ASTM C 1059, Type II.
1. Acceptable at non-structural and structural bonding applications, interior or exterior, unless noted otherwise in Contract Documents.
 2. Use only acrylic or styrene butadiene latex based adhesives.
 3. Manufacturers and Products:
 - a. Euclid Chemical Company; SBR Latex
 - b. L & M Construction Chemicals; Everbond
 - c. W.R. Meadows, Inc.; ACRY-LOK
- C. Polyvinyl Acetate Bonding Agents: ASTM C 1059, Type I.
1. Acceptable at non-structural and structural bonding applications, interior surfaces not subject to water exposure or high humidity during construction or in-service.
 2. Manufacturers and Products:
 - a. Euclid Chemical Company; Euco Weld.
 - b. L & M Construction Chemicals; Everweld.
 - c. W.R. Meadows, Inc.; Intralok.

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- D. Patching Mortar: Packaged, dry mix polymer-modified, cementitious patching mortar complying with ASTM C 928 that contains a non-redispersible latex additive as either a dry powder or a separate liquid that is added during mixing.
- E. Coarse Aggregate: Washed aggregate complying with ASTM C 33, Size No. 8, Class 5S. Add only as permitted by patching mortar manufacturer.
- F. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.
- G. Self-Leveling Concrete Underlayment - Non-traffic-bearing:
1. Description: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 in (3 mm) to 1 in (25 mm) and that can be feathered at edges to match adjacent floor elevations. Interior use only, unless exterior application recommended by manufacturer within written literature.
 2. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 3. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 4. Aggregate: Well-graded, washed sand as recommended by underlayment manufacturer.
 5. Compressive Strength: 4,000 psi minimum at 28 days when tested according to ASTM C 109.
 6. Substrate Preparation: As recommended by product manufacturer.
 7. Basis of Design (Product Standard): Ardex, Inc.; "Ardex K-15".
 8. Manufacturers: (Consult manufacturer for specific product and compatibility with substrate conditions. Subject to Architect's and Engineer's review and approval.)
 - a. Ardex, Inc.
 - b. BASF
 - c. Euclid Chemical Co.
- H. Self-Leveling Concrete Topping - Traffic-bearing:
1. Description: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/2 in (12 mm) to 2 in (50 mm). Consult manufacturer for thickness exceeding 2 in (50 mm). Interior use only, unless exterior application recommended by manufacturer within written literature.
 2. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 3. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 4. Aggregate: Well-graded, washed gravel, 1/8 in (3 mm) to 3/8 in (10 mm) or coarse sand as recommended by topping manufacturer for specific application thickness. No coarse aggregate permitted for thicknesses of 1 in (25 mm) or less.
 5. Compressive Strength: 5,000 psi minimum at 28 days when tested according to ASTM C 109.
 6. Substrate Preparation: As recommended by product manufacturer.
 7. Basis of Design (Product Standard): Ardex Inc.; "Ardex SD-T".
 8. Manufacturers: (Consult manufacturer for specific product and compatibility with substrate conditions. Subject to Architect's and Engineer's review and approval.)

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- a. Ardex, Inc.
- b. BASF
- c. Euclid Chemical Co.
- d. Sika Corp.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. Respective manufacturer/fabricator's written installation instructions.
 - 2. Accepted submittals.
 - 3. Contract Documents.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Concrete Removal: Saw-cut perimeter of areas indicated for removal to a depth of at least **1/2 in (12 mm)**. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcing. Remove loose and deteriorated concrete.
- C. Preparation of Floor Joints: Saw-cut joints full width to edges of spalls and to a depth of at least **3/4 in (19 mm)**. Clean out debris and loose concrete; vacuum or blow clear with compressed air.
- D. Surface Preparation for Patching Mortar: Clean concrete by scarifying or sand blasting to remove dirt, oils, films, and other materials detrimental to patching application. Allow surface to dry before applying mortar.
- E. Surface Preparation for Toppings: Remove delaminated material and deteriorated concrete surface material. Roughen surface of concrete by shot blasting, to produce a surface profile recommended by manufacturer. Sweep and vacuum roughened surface to remove debris followed by low-pressure water cleaning.

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3.4 APPLICATION

- A. Epoxy Bonding Agent: Apply to reinforcing bars and concrete by brush, roller, or spray according to manufacturer's written instructions, leaving no pinholes or other uncoated areas. Apply to reinforcing bars in at least two coats, allowing first coat to dry before applying second coat. Apply patching mortar or concrete while epoxy is still tacky. If bonding agent dries, recoat before placing patching mortar or concrete.
- B. Latex Bonding Agent, Type II: Mix with Portland cement and scrub into concrete surface according to manufacturer's written instructions. If bonding agent dries, recoat before placing patching mortar or concrete.
- C. Latex Bonding Agent, Type I: Apply to concrete by brush roller or spray. Allow to dry before placing patching mortar or concrete.
- D. Patching Mortar: Unless otherwise recommended by manufacturer, apply as follows:
1. Wet substrate thoroughly and then remove standing water. Scrub slurry of neat patching mortar into substrate, filling pores and voids.
 2. Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
 3. For vertical patching, place material in lifts of not more than 1 in (25 mm) or less than 1/4 in (6 mm). Do not feather edge.
 4. For overhead patching, place material in lifts of not more than 1/2 in (12 mm) or less than 1/8 in (3 mm). Do not feather edge.
 5. After each lift is placed, consolidate material and screed surface.
 6. Where multiple lifts are used, score surface of lifts to provide a rough surface for application of subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
 7. Allow surfaces of lifts that are to remain exposed to become firm and then finish to match adjacent surface.
 8. Wet-cure cementitious patching materials, including polymer-modified, cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.
- E. Epoxy Joint Filler: Install in nonmoving floor joints where indicated.
1. Install filler to a depth of at least 1 in (25 mm). Use fine silica sand no more than 1/4 in (6 mm) deep to close base of joint. Do not use sealant backer rods or compressible fillers below joint filler.
 2. Install filler so that when cured, it is flush at top surface of adjacent concrete. If necessary, overfill joint and remove excess when filler has cured.
- F. Topping or Underlayment: Mix and apply self leveling components according to manufacturer's written instructions.
1. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
 2. Apply to produce uniform, level surface.
 3. Add aggregate for thicker areas as recommended by manufacturer.
 4. Apply a final layer without aggregate if required to produce smooth surface.

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5. Feather edges to match adjacent floor elevations.
6. Cure according to manufacturer's written instructions.
7. Prevent contamination during application and curing processes.
8. For areas which are to have finish flooring, use self-leveling concrete underlayment.
9. For areas which will be exposed as wearing surface, use self-leveling concrete topping.

END OF SECTION

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SECTION 05 5000

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Metal fabrications and supplementary items necessary for installation.

1.2 DEFINITIONS

- A. Unprotected Areas: Exterior areas directly exposed to the elements such as rain, snow, or ice.
- B. Protected Areas: Interior and exterior areas not directly exposed to the elements such as rain, snow, or ice.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer/fabricator's technical literature for each product and system indicated.
 - 1. Include manufacturer/fabricator's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.
 - 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.
- B. Welding Qualifications: Qualify procedures and personnel according to following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel".
 - 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel".
 - 4. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum".

1.5 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

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1.6 PROJECT CONDITIONS

- A. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.
- B. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
- B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other available manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer/fabricator. Provide secondary materials only as recommended by manufacturer/fabricator of primary materials.

2.3 FERROUS METAL MATERIALS

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, blemishes, or other imperfections where exposed to view on finished units. Do not use steel sheet with variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.
 - 1. Marking Systems for Metal Fabrications: Where finished items are exposed to view, use temporary tags attached with wires or other system acceptable to Architect.
- B. Steel:
 - 1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 2. Steel Tubing: ASTM A 500, cold-formed steel tubing.
 - 3. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless another weight is indicated or required by structural loads.

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4. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
5. Finish:
 - a. Unprotected Areas: Galvanized metal.
 - b. Protected Areas: Uncoated ferrous metal.
 - c. Location: Roof mechanical equipment screen wall.

C. Stainless Steel:

1. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
 2. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
 3. Rolled-Stainless-Steel Floor Plate: ASTM A 793.
- D. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.4 NON-FERROUS METAL MATERIALS

- A. Aluminum Plate and Sheet: ASTM B 209/B 209M, Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221/B 221M, Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.5 FASTENERS

- A. Fastener Type and Material: Select fasteners for type, grade, and class required to produce connections suitable for anchoring fabrications to other types of construction indicated.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307/F 568M, Grade A/ ASTM F 568M, Property Class 4.6; with hex nuts, ASTM A 563/A 563M; and, where indicated, flat washers.
- C. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593/F 738M; with hex nuts, ASTM F 594/F 836M; and, where indicated, flat washers; and as follows:
 1. Protected Areas:
 - a. Alloy Group 1 (A1) for Type 304.
 2. Unprotected Areas:
 - a. Alloy Group 1 (A1) for Type 304.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563/ A 563M; and, where indicated, flat washers. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

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- E. Plain Washers: Round carbon steel, ASME B18.22.1/ASME B18.22M.
- F. Lock Washers: Helical, spring type carbon steel, ASME B18.21.1/ASME B18.21.2M.
- G. Eyebolts: ASTM A 489.
- H. Machine Screws: ASME B18.6.3/B18.6.7M.
- I. Lag Screws: ASME B18.2.1/B18.2.3.8M.
- J. Wood Screws: ASME B18.6.1, flat head, carbon steel.

2.6 ANCHORS

- A. General: Provide anchors capable of sustaining, without failure, a load equal to 6 times load imposed when installed in unit masonry and 4 times load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- B. Cast-in-Place Anchors in Concrete: Bolts, washers, and shims as needed, either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel; hot-dip galvanized according to ASTM F 2329.
- C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - 1. Protected Areas:
 - a. Steel: Carbon steel components zinc plated to comply with ASTM B 633 or ASTM F 1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - b. Stainless Steel: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593/F 738M; with hex nuts, ASTM F 594/F 836M; and, where indicated, flat washers; Alloy Group 1 (A1) for Type 304.
 - c. Locations: Where specified or where indicated on drawings.
 - 2. Unprotected Areas: Stainless steel bolts, ASTM F 593/F 738M, and nuts, ASTM F 594/F 836M; and as follows:
 - a. Alloy Group 1 (A1) for Type 304.
 - 3. Post-Tensioned Concrete Locations: Anchors shall not exceed 1 in (25 mm) embedment. Obtain Structural Engineer's written approval for all proposed anchors in post-tensioned concrete prior to installation.

2.7 PAINT MATERIALS

- A. Paint for Steel Fabrications: As specified in Division 09 Section "Painting".
- B. Galvanizing Repair Paint for Steel Fabrications in Unprotected Areas: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- C. Bituminous Paint for Aluminum Fabrications: ASTM D 1187, cold-applied asphalt emulsion.

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2.8 ACCESSORY ITEMS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with minimum 28 day compressive strength of 3000 psi (210.92 k/cm), unless otherwise indicated.
- C. Non-shrink, Non-metallic Grout: Factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer/fabricator.

2.9 FABRICATION, GENERAL

- A. General: Fabricate metal fabrications, including clips, brackets, and other components necessary to support and anchor fabrications to supporting structure, and to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage.
 - 1. Join components by welding unless otherwise indicated.
- B. Shop Assembly: Assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces.
- C. Fabrication Requirements:
 - 1. Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges to a radius of approximately 1/32 in (0.8 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
 - 2. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
 - 3. Form work true to line and level with accurate angles and surfaces and straight sharp edges.
 - 4. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
 - 5. Unprotected Areas:
 - a. Allow for thermal movement resulting from 120 deg F (49 deg C) change (range) in ambient and 180 deg F (82 deg C) surface temperatures by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - b. Fabricate hot-dip galvanized fabrications so that field assembly will be by bolted connections and not welding.
 - c. Fabricate joints exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- D. Assembly Requirements:

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1. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
2. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.
3. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/4 in by 1-1/4 in (6 mm by 31 mm), with a minimum 6 in (150 mm) embedment and 2 in (50 mm) hook, not less than 8 in (200 mm) from ends and corners of units and 24 in (600 mm) on center, unless otherwise indicated.
4. Complete fabrication prior to shop painting or hot-dip galvanizing.

E. Shop-Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings. Weld corners and seams continuously to develop full strength of member to comply with following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

2.10 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports that are not a part of structural framework as necessary to complete the Work.
- B. Fabricate units from structural-steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors 1-1/4 in (32 mm) wide by 1/4 in (6 mm) thick by 8 in (200 mm) long at 24 in (600 mm) on center, unless otherwise indicated.

2.11 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from structural-steel shapes, plates, and bars of profiles shown with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 in (150 mm) from each end, 6 in (150 mm) from corners, and 24 in (600 mm) on center, unless otherwise indicated.

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2.12 FINISHES, GENERAL

- A. Finish Quality Standard: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Finish metal fabrications after assembly.
 - 2. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.13 STEEL FINISHES

- A. Unprotected Areas:
 - 1. Galvanized Finish: Hot-dip galvanize according to following. For surfaces to be painted, do not quench or apply post galvanizing treatments that might interfere with paint adhesion. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
 - a. Steel and Iron Products: ASTM A 123.
 - b. Steel and Iron Hardware: ASTM A 153.
 - 2. Cleaning: After galvanizing, thoroughly clean surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- B. Protected Areas:
 - 1. Shop Priming: Comply with Division 09 Section "Painting" and as follows:
 - a. Preparation of Uncoated Surfaces: Prepare uncoated surfaces to comply with requirements of coating product to be used, but not less than minimum requirements of SSPC-SP 6/NACE No. 3 surface preparation specifications and environmental exposure conditions of installed fabrications.
 - b. Application: SSPC-PA 1; apply shop primer to uncoated surfaces. Stripe paint corners, crevices, bolts, welds, and sharp edges.
- C. Field-Applied Coatings: As specified in Division 09 Section "Painting". Paint all steel fabrications unless noted otherwise.

2.14 STAINLESS STEEL FINISHES

- A. Stainless Steel Fabrications: As-fabricated finish.

2.15 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive metal fabrications and associated Work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting Work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
1. Respective manufacturer/fabricator's written installation instructions.
 2. Accepted submittals.
 3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3.3 PREPARATION

- A. General: Comply with manufacturer/fabricator's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

3.4 INSTALLATION OF METAL FABRICATIONS

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, through bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Connections at Unprotected Areas: Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of units that have been coated or finished after fabrication and are intended for bolted or screwed field connections or other means without further cutting or fitting.
- D. Field Welding: Weld connections continuously to develop full strength of member to comply with following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.

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4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Corrosion Protection: Coat concealed aluminum surfaces that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with heavy coat of bituminous paint.

3.5 INSTALLATION OF MISCELLANEOUS ITEMS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturer/fabricators' written instructions and requirements indicated on Shop Drawings.

3.6 ADJUSTING AND CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0 mil (0.05 mm) dry film thickness.

B. Galvanized Surfaces at Unprotected Areas: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

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SECTION 06 1053

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Miscellaneous rough carpentry and supplementary items necessary for installation.

1.2 DEFINITIONS

- A. Dimension Lumber: Lumber of **2 in nominal (38 mm actual)** or greater, but less than **5 in nominal (114 mm actual)** in least dimension.
- B. Lumber Grading Agencies:
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.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
 2. Preservative-Treated Wood: 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, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
 3. Fire-Retardant-Treated Wood: 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, both before and after exposure to elevated temperatures when tested according to ASTM D 5664.
 4. Waterborne-Treated Wood: For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 5. Warranties: Include copies from chemical treatment manufacturers for each type of treatment.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

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1.5 PROJECT CONDITIONS

- A. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.6 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Engineer products and systems to withstand loads within limits of allowable working stresses of the materials involved under conditions indicated and without permanent deformation or failure of materials.
- B. Miscellaneous Rough Carpentry within Roofing System Assemblies: Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing system assembly and flashings shall be fabricated and installed to withstand specified uplift pressures and thermally induced movement without contributing to failure of roofing system or flashings.
- C. Surface Burning Characteristics for Fire-Retardant-Treated Wood: Products and construction identical to assemblies tested for fire resistance according to ASTM E 84/NFPA 255/UL 723 and included under Category BPVV published in Underwriters Laboratories, Inc. (UL) "Fire Resistance Directory"; or listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Flame Spread: Class A - no greater than 25.
 - 2. Smoke Developed: No greater than 450.

2.3 WOOD PRODUCTS

- A. Dimension Lumber:
 - 1. Material Quality Standards: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with applicable rules of any rules-writing agency certified by ALSC Board of Review. Provide lumber graded by an agency certified by ALSC Board of Review to inspect and grade lumber under rules indicated.
 - 2. Grade: Provide No. 2 grade, of any of following species:
 - a. Hem-fir (north); NLGA.
 - b. Hem-fir; WCLIB, or WWPA.

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- c. Mixed southern pine; SPIB.
 - d. Spruce-pine-fir; NLGA.
 - e. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 - f. Douglas fir-larch; WCLIB or WWPA.
 - g. Douglas fir-larch (north); NLGA.
 - h. Douglas fir-south; WWPA.
 - i. Northern species; NLGA.
 - j. Eastern softwoods; NeLMA.
 - k. Western woods; WCLIB or WWPA.
3. Grade Marking: Factory mark each piece of lumber with grade stamp of grading agency.
 4. Sizes: 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.
 5. Finish: Provide dressed lumber, sanded four sides, unless otherwise indicated.
 6. Maximum Moisture Content:
 - a. Provide kiln-dry lumber with 19 percent maximum moisture content at time of dressing for 2 in nominal (38 mm actual) thickness or less, for concealed conditions.
 - b. Provide kiln-dry lumber with 15 percent maximum moisture content at time of dressing for 2 in nominal (38 mm actual) thickness or less, for exposed conditions.

B. Plywood:

1. Material Quality Standard: DOC PS 1, Exposure 1.
2. Grades: Furnish the grades below according to installation location:
 - a. A-C; when exposed at occupied interior locations.
 - b. B-C; when exposed at mechanical and electrical equipment rooms.
3. Grade Marking: Factory mark each piece of plywood with grade stamp of grading agency.
4. Thickness: Not less than 1/2 in (12 mm), unless indicated otherwise.

2.4 TREATED WOOD PRODUCTS

A. Preservative-Treated Wood:

1. Product Quality Standard: AWWA, Use Category UC4a, for species, product, preservative, and end use. Use preservative treatment that does not promote corrosion of metal fasteners.
2. Description: Wood products impregnated with chemicals by pressure process acceptable to authorities having jurisdiction, according to the following:
 - a. Listed in Section 4 of AWWA U1.
 - b. Containing no arsenic or chromium.
3. Field Preservative-Treatment for Cut Surfaces: Apply one of the following depending upon conditions listed below, in accordance with AWWA M4:
 - a. Continuously Protected from Liquid Water: Inorganic boron.

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b. Not Continuously Protected from Liquid Water: Copper naphthenate.

B. Fire-Retardant-Treated Wood:

1. Product Quality Standards: Provide materials that comply with performance requirements in AWWA C20 (lumber) and AWWA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction. Use fire-retardant treatment that does not promote corrosion of metal fasteners.
 - a. Concealed Wood Blocking: Chemical formulations for fire retardant treatment to contain a compatible, non-bleed, light fast, colored dye to identify and indicate treatment.
2. Description: Wood products impregnated with chemicals by pressure process, or other means acceptable to authorities having jurisdiction, having following characteristics:
 - a. Fire-retardant-treated materials shall comply with performance requirements specified above after being subjected to accelerated weathering according to ASTM D 2898.
 - b. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.
 - c. Use Interior Type A High Temperature (HT), unless otherwise indicated.

C. Moisture Content: Kiln-dry wood after treatment to following maximum moisture content:

1. 19 percent for lumber.
2. 15 percent for plywood.

D. Quality Marking: Identify with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

2.5 FASTENERS

- A. Fastener Types and Materials: Select fasteners for type, grade, and class required. Unless otherwise indicated, furnish Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 / F 1941M, Class Fe/Zn 5, within roofing system assemblies.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: ICC-ES NER-272.
- D. Powder-Actuated Fasteners: ANSI A10.3; low velocity, powder-actuated fasteners; drive pins and washers fabricated from corrosion-resistant materials; powder loads suitable for application indicated; and capable of sustaining, without failure, an ultimate load capacity not less than 10 times that imposed by construction as determined by testing according to ASTM E 1190 by a qualified independent testing agency.
- E. Wood Screws: ASME B18.6.1, flat head, carbon steel.

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- F. Screws for Fastening to Metal Framing: As specified in the following locations:
 - 1. Division 05 Section "Cold-Formed Steel Framing".
 - 2. Division 09 Section "Gypsum Board Assemblies".
- G. Lag Bolts: ASME B18.2.1/ASME B18.2.3.8M.
- H. 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.

2.6 ANCHORS

- A. Anchors: Capable of sustaining, without failure, a load equal to 6 times load imposed when installed in unit masonry and 4 times load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- B. Cast-in-Place Anchors in Concrete: Bolts, washers, and shims as needed, either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47 / A 47M malleable iron or ASTM A 27 / A 27M cast steel; hot-dip galvanized according to ASTM F 2329.
- C. Post-Installed Anchors:
 - 1. Generic Type: Torque-controlled expansion anchors.
 - 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 / F 1941M, Class Fe/Zn 5, unless otherwise indicated.
 - 3. Material for Exterior Locations and where Stainless Steel is indicated: Stainless steel with bolts and nuts complying with **ASTM F 593 and ASTM F 594, Alloy Group 1 or 2** (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products, fabrications, and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. Respective manufacturer written installation instructions.
 - 2. Accepted submittals.
 - 3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

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C. General Requirements:

1. Securely attach Work to substrate according to authorities having jurisdiction.
2. Select fasteners of appropriate size, type, and length that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Pre-drill members when necessary to avoid splitting wood while installing fasteners. Do not countersink nail heads, unless otherwise indicated. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
3. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber.
4. Do not use material with the following conditions:
 - a. Material that is warped or does not comply with requirements for untreated material.
 - b. Materials with defects that interfere with function of member.
 - c. Pieces which are too small to use with minimum number of joints or optimum joint arrangement.
5. Set carpentry to required levels and lines, with members plumb, true to line, and level. 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.
6. Apply field preservative-treatment to cut surfaces of preservative-treated wood.
7. Where preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

D. Schedule of Applications:

1. Preservative-Treated Wood: Use preservative-treated wood for the following applications:
 - a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing systems.
 - b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - c. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
2. Fire-Retardant-Treated Wood: Use fire-retardant-treated wood for the following applications:
 - a. Concealed wood blocking within interior partitions.
 - b. Exposed plywood backing panels supporting equipment at interior locations.
3. Untreated Wood: Not allowed.

3.3 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Coordinate locations with other work involved.
- B. Securely attach items to substrates to support applied loading.

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3.4 PLYWOOD INSTALLATION

- A. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
- B. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

3.5 PROTECTION

- A. General: Protect untreated wood, and wood that has been treated with chemicals that can leach, from deterioration due to weather.

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SECTION 07 8413

PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes penetration firestopping systems for openings and penetrations through smoke and fire-resistance-rated assemblies, and supplementary items necessary to complete their installation.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
 - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency..
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Project Acceptance Document: Certification by the manufacturer that its product(s) are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that a warranty will be issued.
- B. Field Quality Control Reports: Written report of testing and inspection required by "Field Quality Control".

1.4 CLOSEOUT SUBMITTALS

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

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

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1.6 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.
- B. Environmental Limitations: Do not install firestopping systems when ambient or substrate temperatures are outside limits permitted by firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- C. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.
- B. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- C. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate firestopping systems.
- D. Notify Owner's inspecting agency at least seven days in advance of firestopping system installations; confirm dates and times on days preceding each series of installations.
- E. Do not cover up firestopping system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 FIRESTOPPING, GENERAL

- A. Acceptable Manufacturers: Manufacturer is "acceptable" if firestopping system has been tested and listed by UL or other testing and inspection agency acceptable to authorities having jurisdiction and manufacturer can evidence product compliance with requirements of the Contract Documents.
 - 1. FM Global: Manufacturer to provide firestopping products in compliance with FM Global requirements as indicated in "Quality Assurance" Article.
- B. Compatibility: Provide firestopping systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating firestopping systems, under conditions of service and application, as demonstrated by firestopping system manufacturer based on testing and field experience.

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- C. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials and approved by the qualified testing and inspection agency for firestopping systems indicated.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide firestopping systems that are 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 assembly penetrated.
- B. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency acceptable to authorities having jurisdiction.
 - 1) UL Fire Resistance Directory.
 - 2) Intertek Group Directory of Listed Building Products.
 - 3) FM Global Building Materials Approval Guide.

2.3 PENETRATION FIRESTOP SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. Classified in Underwriters Laboratories (UL) Fire Resistance Directory, Section XHEZ - Penetration Firestop System", and/or Section XHHW - Fill Void or Cavity Materials for specific project conditions.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479.
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479.
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistive shaft enclosures.
 - c. Penetrations located in construction containing fire-protection-rated openings.

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3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems 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 and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.
- E. Penetrations in Fire-Resistance-Rated Smoke Barriers: In addition to penetration firestopping systems with L-Ratings determined per UL 1479, provide F-Ratings and T-Ratings determined per ASTM E 814 or UL 1479.
- F. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 1. Permanent forming/damming/backing materials.
 2. Substrate primers.
 3. Collars.
 4. Steel sleeves.

2.4 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- 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 intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- 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 nonshrinking, homogeneous mortar.

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- 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, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.
- K. Additional Application Requirements:
 - 1. Firestops exposed to view and/or are scheduled to receive finishes shall be paintable or capable of receiving finish materials.
 - 2. Firestops exposed to traffic, moisture, and physical damage shall be products that do not deteriorate when exposed to these conditions.
 - 3. Firestops for water piping penetrations, of any type, shall be moisture-resistant products.
 - 4. Firestops for floor penetrations with annular spaces exceeding 4 in (100 mm) or more in width and exposed to possible loading and traffic shall be products capable of supporting the floor loads involved either by installing floor plates or by other means.
 - 5. Firestops for penetrations involving insulated piping shall be products that do not require removal of insulation.
 - 6. Firestops for cable trays and future penetrations shall be reusable pillows or bags.
- L. Provide firestops within fire resistive walls and partitions containing flush mounted devices such as outlet boxes, electrical cabinets and mechanical cabinets mounted back to back and spaced less than 24 inches on center in accordance with UL Fire Resistance Directory "Wall Opening Protective Materials", Category CLIV.

2.5 MIXING

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

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3.2 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Surface Cleaning: Before installing fire-resistive penetration systems, clean penetrations immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements.
 - 1. Remove foreign materials from surfaces of openings, joints and penetrating items that could interfere with adhesion of firestopping.
 - 2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form release agents from concrete.
- C. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- D. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

3.3 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. Respective manufacturer written installation instructions.
 - 2. Accepted submittals.
 - 3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3.4 INSTALLATION OF PENETRATION FIRESTOPS

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

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- C. Install fill materials for penetration firestop systems by proven techniques to produce the following results:
1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 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 Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.5 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than **3 inches (76 mm)** high and with minimum **0.375-inch (9.5-mm)** strokes.
1. Locate in accessible concealed floor, floor-ceiling, or attic space at **15 feet (4.57 m)** from end of wall and at intervals not exceeding **30 feet (9.14 m)**.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within **6 inches (150 mm)** of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Tested System or Engineered Judgement Number.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Manufacturer's qualified technical representative shall periodically inspect Work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions, and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.
1. Manufacturer's Technical Representative Qualifications: Direct employee of technical services department of manufacturer with experience in providing recommendations, observations, evaluations, and problem diagnostics.
- B. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- C. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

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1. Materials and installation failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at Contractors expense.
 - D. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.
- 3.7 CLEANING
- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping system products and of products in which opening and joints occur.
 - B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION

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SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Joint sealants, backing materials, and supplementary items necessary for installation.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Samples for Verification Purposes: Samples for each kind and color of joint sealants in **1/2 in (12 mm)** wide joints formed between two **6 in (150 mm)** long strips of material matching appearance of exposed surfaces adjacent to joint sealants.
- C. 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, primers and backers.
 4. Joint-sealant color.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.
 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.
 3. Manufacturer Acceptance: Installer shall be certified, approved, licensed, or acceptable to manufacturer to install products.

1.4 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Ambient Conditions: Install joint sealants within range of ambient and substrate temperatures and moisture conditions as recommended by manufacturer. Protect substrates from environmental conditions that affect performance.

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1.6 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

1.7 WARRANTY

- A. Installer's Warranty: Furnish installer's written warranty for a period of 2 years from date of Substantial Completion signed by an authorized representative using installer's standard form agreeing to provide labor required to repair or replace work which exhibits workmanship defects. "Defects" is defined to include but not limited to deterioration or failure to perform as required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to Conditions of the Contract and Division 01 Section "Substitution Procedures".

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.
- B. Compatibility: Joint sealants, backings, and other related materials shall be 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.
- C. Suitability for Contact with Food: Comply with authorities having jurisdiction for joints in repeated contact with food.
- D. Sealant Color: As scheduled or as indicated in Design Selections.

2.3 INTERIOR ELASTOMERIC SEALANTS

- A. Interior Non-sag Silicone Sealant:
 - 1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 25.
 - 2. Description: Single component, non-sag, moisture curing, silicone sealant specially formulated with fungicide for use in sanitary non-porous applications.
 - 3. Manufacturers and Products:
 - a. Dow Corning; 786 Silicone Sealant.
 - b. Momentive Performance Materials, GE Silicones; Sanitary SCS1700.
 - c. Pecora Corp.; 898.
 - d. Sika Corp., Construction Products Div.; Sikasil GP
 - e. Tremco Commercial Sealants & Waterproofing; Tremsil 200.

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B. Interior Non-sag Urethane Sealant:

1. Product Quality Standard: ASTM C 920, Type S, Grade NS, Class 25 or 35.
2. Description: Single component, non-sag, moisture curing, non-staining as determined by pre-construction stain testing if exposed, polyurethane sealant.
3. Joint Movement Capability: Plus 25 percent, minus 25 percent, or plus 35 percent, minus 35 percent.
4. Primers: Product provided by sealant manufacturer if required by conditions.
5. Manufacturers and Products:
 - a. BASF; MasterSeal NP 1 (Formerly Sonolastic NP 1).
 - b. Pecora Corp.; Dynatrol I-XL.
 - c. Sika Corp., Construction Products Div.; Sikaflex 1a or Sikaflex Textured Sealant.
 - d. Tremco Commercial Sealants & Waterproofing; Dymonic or Vulkem 116.

C. Interior Non-sag Acrylic Latex Sealant:

1. Product Quality Standard: ASTM C 834, Type and Grade as required by conditions.
2. Description: Single component, non-sag, moisture curing, general purpose, paintable, siliconized acrylic latex sealant.
3. Joint Movement Capability: Plus 7.5 percent, minus 7.5 percent
4. Manufacturers and Products:
 - a. Pecora Corp.; AC 20+.
 - b. Tremco Commercial Sealants & Waterproofing; Tremflex 834.

D. Sprayed Foam Insulating Gap Filler:

1. Description: Low pressure, one-component, expanding, open-cell latex-based insulating foam gap filler; applied with professional hand-held dispensing gun; CFC and HCFC free.
2. Performance Requirements: Class 1 Fire-Retardant per ASTM E 84.
3. Manufacturers and Products:
 - a. Convenience Products; Touch 'ÜN Foam, Easy Fill Latex Foam Sealant.
 - b. DAP Products, Inc.; DAPtex Plus.

E. Acoustical Sealants: As specified in Division 09 Section "Gypsum Board Assemblies".

F. Fire Resistive Sealants: As specified in Division 07 Section "Fire Resistive Joint Firestopping".

2.4 JOINT SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Use open cell (Type O) sealant backing rod at interior line of sealant for double sealed condition unless otherwise recommended by sealant manufacturer.

B. Cylindrical Sealant Backings:

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1. Product Quality Standard: ASTM C 1330, Type C, Type O, Type B; as approved in writing by joint-sealant manufacturer for joint application indicated.
2. Description: Extruded polyethylene, polyurethane, or polyolefin in either closed cell structure (Type C), open cell structure (Type O), or bicellular structure with surface skin (Type B) as defined by ASTM Terminology C 717.
3. Size: Diameter approximately 25 percent larger than joint width, unless otherwise directed by manufacturer.
4. Manufacturers and Products:
 - a. Type C:
 - 1) BASF; MasterSeal 920 (Formerly Sonneborn, Closed-Cell Backer Rod).
 - 2) Nomaco Inc.; Green Rod or HBR.
 - b. Type O:
 - 1) Backer Rod Mfg. Inc.; Denver Foam.
 - 2) Nomaco Inc.; Foam-Pak II.
 - c. Type B:
 - 1) BASF; MasterSeal 921 (Formerly Sonneborn, Soft Backer Rod).
 - 2) Nomaco Inc.; Dual-Rod or Sof-Rod.

- 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 where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 ACCESSORIES

- A. Cleaners for Non-porous 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 non-porous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- B. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrate surfaces to receive products and systems and associated Work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting Work within a particular area will be construed as acceptance of surface conditions.

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3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
1. Respective manufacturer's written installation instructions.
 2. Accepted submittals.
 3. Contract Documents.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Cleaning of Joints: Clean out joints immediately before installing joint backings and sealants to comply with joint sealant manufacturer's written instructions and following requirements:
1. Remove foreign material that could interfere with adhesion of joint sealant, including, but not limited to, 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.
 3. Remove laitance and form-release agents from concrete.
 4. Clean non-porous 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.
 5. Substrate material allowed by sealant's ASTM C 920 Use Classification.
- C. Joint Priming: Prime joint substrates where recommended by joint sealant manufacturer, or as indicated by prior experience, or as required by pre-construction compatibility and adhesion testing. 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.
- D. 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.

3.4 INSTALLATION

- A. Joint Sealant Backings: Install type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear backings.

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3. Remove absorbent sealant backings that have become wet or damaged before sealant application and replace with dry materials.
 4. Install bond-breaker tape behind sealants where backings are not used between sealants and backs of joints.
- B. Joint Sealants: Install at same time as backings using proven techniques that comply with following:
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.
 4. 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.
 - a. Remove excess sealant from surfaces adjacent to joints.
 - b. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - c. Use masking tape to protect surfaces adjacent to recessed tooled joints.
 5. Install joint sealants in accordance with ASTM C 1193 as applicable to materials, applications, conditions indicated, and with the following profile configurations:
 - a. Fillet: Figure 5.
 - b. Bridge: Figure 6.
 - c. Butt: Figure 8A (concave tooling), generally hour-glass shape with 2:1 width-to-depth ratio.
- C. Sprayed Foam Insulating Gap Filler: Apply sprayed foam insulating gap filler within exterior wall assemblies using professional hand-held dispensing gun in accordance with manufacturer's written instructions.
1. Prior to installation of wall finish systems, apply sprayed foam insulating gap filler to gaps, cracks, cavities, openings, and voids in exterior wall back-up, including annular space around piping, ducts, conduits, wiring, and electrical outlets to seal off potential air drafts.
 2. After sprayed foam sealant is applied, make flush with face of adjacent wall by using method recommended by manufacturer.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Manufacturer's qualified technical representative shall periodically inspect Work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions, and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.
1. Manufacturer's Technical Representative Qualifications: Direct employee of technical services department of manufacturer with experience in providing recommendations, observations, evaluations, and problem diagnostics.

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- B. Field Adhesion Testing: Before installation, field test urethane and silicone sealant adhesion to joint substrates as follows:
1. General Requirements:
 - a. Locate test joints where indicated or, if not indicated, as directed by Architect.
 - b. Conduct field tests for each kind of urethane and silicone sealants and joint substrates indicated.
 - c. Notify Architect 7 days in advance of dates and times when test joints will be erected.
 2. Test Frequency: Perform 1 test for each 1000 ft (300 m) of joint length thereafter or 1 test for each floor at each elevation.
 3. Test Methods: Joint sealant manufacturer's technical representative shall conduct following tests:
 - a. When Joint Substrates are Identical: Test joint sealants according to ASTM C 1193, Method A (field-applied sealant joint hand pull tab) described below:
 - 1) Conduct one test and one additional test for each 1000 ft (300 m) of kind of joint sealant material and substrate conditions.
 - 2) Install 24 in (600 mm) long test specimens using same materials, methods for joint preparation, and joint sealant installation required for Work. Allow sealants to cure fully before testing.
 - 3) Make horizontal knife cut across width of sealant joint from one substrate to other substrate.
 - 4) Make 2 vertical cuts at both sides of substrates, downward starting at horizontal cut, approximately 3 in (75 mm) long.
 - 5) Grasp 3 in (75 mm) long piece of sealant tab firmly 1 in (25 mm) from its bonded edge and pull at not less than 90 degree angle.
 - 6) Substrate adhesion is acceptable if sealant tears cohesively within itself or elongates to a manufacturer determined extension value from 1 in (25 mm) gauge length before releasing from substrate adhesively.
 - b. When Joint Substrates are Different: Test joint sealants according to ASTM C 1193, Method C (field-applied sealant joint hand pull flap) described below:
 - 1) Conduct one test and one additional test for each 1000 ft (300 m) of kind of joint sealant material and substrate conditions.
 - 2) Install 24 in (600 mm) long test specimens using same materials, methods for joint preparation, and joint sealant installation required for Work. Allow sealants to cure fully before testing.
 - 3) Make first horizontal knife cut across width of sealant joint from one substrate to other substrate.
 - 4) Make one vertical cut along one side of substrate, downward starting at horizontal cut, approximately 3 in (75 mm) long.
 - 5) Make second horizontal knife cut across width of sealant joint from one substrate to other substrate at opposite end of 3 in (75 mm) long first cut.
 - 6) Grasp 3 in (75 mm) long piece of sealant flap firmly and pull at not less than 90 degree angle.

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- 7) Substrate adhesion is acceptable if sealant tears cohesively within itself or elongates to a manufacturer determined extension value from 1 in (25 mm) gauge length before releasing from substrate adhesively.
4. Reports: Report which sealants and joint preparation methods resulted in optimum adhesion to joint substrates or whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each specimen. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
5. Evaluation of Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory. Sealants failing to adhere to joint substrates during testing are not acceptable.

3.6 CLEANING

- A. In-Progress Cleaning: Remove excess sealant or sealant smears adjacent to joints as Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.7 PROTECTION

- A. General Requirements: Protect 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.

3.8 JOINT SEALANT SCHEDULE

- A. Interior Elastomeric Sealant Applications:
 1. Interior Non-sag Silicone Sealant:
 - a. Non-moving joints in moist or damp areas which are susceptible to mildew.
 - b. Non-moving joints in toilet rooms.
 - c. Non-moving joints in kitchens.
 - d. Non-moving joints in repeated contact with food.
 2. Interior Non-sag Urethane Sealant:
 - a. Building joints on interior side of exterior walls where joint movement is anticipated.
 3. Interior Non-sag Acrylic Latex Sealant:
 - a. Non-moving joints where another type of sealant is not otherwise specified or scheduled.
 - b. Minimal moving joints due to temperature change.
- B. Sprayed Foam Insulating Gap Filler Applications:

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1. Interior non-moving gaps around windows, glazed aluminum walls, doors, and penetrations.

END OF SECTION

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SECTION 08 1113

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Custom hollow metal doors and frames and supplementary items necessary for installation.

1.2 DEFINITIONS

- A. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.
- B. Exterior: Areas exposed to the elements and areas located in unconditioned spaces.
- C. Interior: Areas located in conditioned spaces.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
 - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work.
- C. Samples for Verification Purposes: Submit **12 in by 12 in (300 mm by 300 mm)** samples to demonstrate compliance with requirements for quality of materials and construction:
 - 1. Frames: Show profile, head-to-jamb corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.
- D. Door and Frame Schedule: Schedule prepared by or under supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.4 INFORMATIONAL SUBMITTALS

- A. Oversize Construction Certification: Documentation for assemblies required to be fire rated and exceeding limitations of labeled assemblies.
- B. Product Test Reports: Written reports based on evaluation of comprehensive tests performed by qualified testing agency indicating that each product complies with requirements.

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1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with not less than 5 years of experience in the successful production and in-service performance of products and systems similar to scope of this Project.
- B. Installer Qualifications:
 - 1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.
 - 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.

1.6 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.
 - 1. Participants:
 - a. Architect.
 - b. Contractor, including superintendent.
 - c. Installer, including project manager and supervisor.
 - d. If requested, Manufacturer's qualified technical representative.
 - e. Installers of other construction interfaced with Work.
 - 2. Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited to, following topics:
 - a. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
 - b. Review Contract Document requirements.
 - c. Review approved submittals.
 - d. Review inspection and testing requirements.
 - e. Review environmental conditions and procedures for coping with unfavorable conditions.
 - f. Resolve deviations or differences between Contract Documents and the manufacturer's specifications.
 - 3. Record discussions, including decisions and agreements, and prepare report.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4 in (100 mm) high wood blocking. Do not store in a manner that traps excess humidity.

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1. Provide minimum 1/4 in (6 mm) space between each stacked door to permit air circulation.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.
- B. Coordinate installation of anchorages 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.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Engineer products and systems to withstand loads within limits of allowable working stresses of the materials involved under conditions indicated and without permanent deformation or failure of materials.
- B. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- C. Smoke-Control Door Assemblies: Assemblies complying with UL 1784.

2.3 COMPONENT MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008 / A 1008M, Designation CS (Commercial Steel), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011 / A 1011M, Designation CS (Commercial Steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Frame Anchors: ASTM A 591 / A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
- D. Inserts, Bolts, and Fasteners: Device type and size required, hot-dip galvanized according to ASTM A 153 / A 153M, Class B.

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E. Fasteners into Concrete:

1. Powder-Actuated Fasteners: Suitable for application indicated, ANSI A 10.3; low velocity, powder-actuated fasteners; drive pins and clip angles fabricated from corrosion-resistant materials, with clips or other devices for attaching frames into concrete substrate.
2. Available Manufacturers:
 - a. Construction Materials, Inc.
 - b. Heckman Building Products, Inc.
 - c. Hilti Corp.
 - d. ITW Ramset/Red Head.
 - e. Powers Fasteners.
 - f. Simpson Strong Tie Anchor Systems.
3. Post-Tensioned Concrete: For post-tensioned concrete, fasteners shall not exceed **1 in (25 mm)** embedment. Obtain Structural Engineer's written approval for all proposed fasteners in post-tensioned concrete prior to installation.

F. Mineral-Fiber Insulation for Installations in Sound-Rated Partitions: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with **6 to 12 lb/cu ft (96 to 192 kg/cu m)** density; with following characteristics:

1. Flame-Spread Index: 25 maximum.
2. Smoke Development Index: 50 maximum.
3. Combustion Characteristics: Passing ASTM E 136.

G. Glazing: Comply with Division 08 Section "Glazing".

H. Primer: Fast-curing, corrosion-inhibiting, lead and chromate free, universal primer complying with ANSI A224.1 acceptance criteria; compatible with substrate and field-applied finish paint system specified in Division 09 Section Painting.

I. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing minimum of 94 percent zinc dust by weight.

2.4 FABRICATION, GENERAL

A. Fabrication Quality Standard: ANSI/NAAMM-HMMA 861.

B. General Requirements: Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit, and assemble units in manufacturer's plant.

C. Accessories: Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to templates furnished as specified in Division 08 Section "Door Hardware".

1. Locate hardware according to ANSI/NAAMM-HMMA 861.

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2. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.5 HOLLOW METAL FRAMES

A. Fabrication Provisions:

1. Fabricate frames of construction indicated below.
2. Close contact edges of corner joints tight with faces mitered and full-profile continuously welded.
 - a. "Knock-down" frame construction is not acceptable and shall not be used.
3. Close contact edges of stops butted or mitered.
4. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

B. Joinery:

1. Fabrication Quality Standard: Head-to-jamb joints according to ANSI/NAAMM-HMMA 820 for either of following fabrication techniques with:
 - a. Saw-mitered corners, full-profile continuously welded.
 - b. Machine-mitered corners, full-profile continuously welded.
2. Externally or internally weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and seamless.
3. Internally weld rabbet and soffits continuously; grind, fill, dress, and make smooth.
4. Use of gusset or splice plates as substitute for fully welding is not permitted.

C. Materials and Thickness:

1. Cold-rolled steel sheet for frames in the following locations:
 - a. Interior frames.
2. Thickness for Cold-Rolled Steel Sheet Frames:
 - a. 48 in (1200 mm) Wide or Less: 0.053 in (1.3 mm) (16 gage) thick.
 - b. More than 48 in (1200 mm) Wide: 0.067 inch (1.7 mm) (14 gage) thick.
3. Sidelight and Transom Frames: Closed tubular members with no visible face seams or joints fabricated from same type and thickness of material as adjacent door frame.
4. Interior Borrowed-Light Frames: Fabricated from 0.053 in (1.3 mm) (16 gage) thick cold-rolled steel sheet.

D. Stops and Moldings:

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1. Form corners with butted or mitered hairline joints.
 2. Provide around glazed lites where indicated.
 - a. Fixed frame moldings on outside of exterior doors and frames and on secure side of interior doors and frames.
 - b. Loose stops and moldings on inside of hollow metal work so that glass can be removed independently.
 3. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
- E. Hardware Reinforcement: Fabricate from same material as frame. Minimum thickness of steel reinforcing plates for following hardware:
1. Hinges and Pivots: 0.167 in (4.2 mm) (7 gage) thick by 1-1/2 in wide by 6 in (38 mm by 150 mm) longer than hinge, secured by not less than 6 spot welds.
 2. Strikes, Flush Bolts, and Closers: 0.093 in (2.3 mm) (12 gage).
 3. Surface-Mounted Hold-Open Arms and Panic Devices: 0.093 in (2.3 mm) (12 gage).
- F. Head Reinforcement: Provide minimum 0.093 in (2.3 mm) (12 gage) thick, steel channel or angle stiffener for opening widths more than 48 in (1200 mm).
- G. Lead-Lined Door Frames: Comply with standard frame requirements, except 0.067 in (1.7 mm) (14 gage) thick, and lined with lead sheet of thickness not less than required for adjacent walls.
1. Provide additional reinforcements and internal supports to adequately carry weight of lead-lined doors. Install reinforcements and supports before installing lead lining.
 2. Form lead sheet to match frame contour, continuous in each jamb and across head, lapping stops. Form lead shields around areas prepared to receive hardware. Fabricate lead lining wide enough to maintain effective lap with lead in adjacent walls.
- H. Lead-Lined Window (Observation) Frames: Fabricate from 0.043 in (1.1 mm) thick, formed-steel sheet or 0.064 in (1.6 mm) thick aluminum extrusions with mitered corners, welded or bolted with concealed fasteners.
1. Line with lead sheet formed to match frame contour, continuous in each jamb and across head and sill, lapping the stops, and fabricated wide enough to maintain an effective lap with lead of adjoining assemblies.
 2. Construct so lead lining overlaps glazing material perimeter by at least 3/8 in (10 mm) and provide removable stops.
 3. Form sill with an opening for sound transmission. Offset sound passage to make opening lightproof and to maintain required lead equivalence at all points and in all directions.
- I. Jamb Anchors:
1. Types: Fabricated of same material as frame:
 - a. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 in (1.10 mm) (18 gage) thick.

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- b. Masonry Type: Adjustable Z-clip type or T-shaped anchors to suit frame size, not less than **0.042 in (1.10 mm)** (18 gage) thick, with corrugated or perforated straps not less than **2 in (50 mm)** wide by **10 in (250 mm)** long.
 - c. Postinstalled Expansion Type for In-Place Concrete or Masonry: Countersunk, flat or oval head exposed screws and bolts with expansion shields or inserts, minimum **3/8 in (10 mm)** diameter bolts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
2. Quantity and Location:
- a. Stud-Wall Type: Locate anchors not more than **18 in (450 mm)** from top and bottom of frame. Space anchors not more than **32 in (800 mm)** on centers and as follows:
 - 1) Three anchors per jamb up to **60 in (1500 mm)** high.
 - 2) Four anchors per jamb from **60 to 90 in (1500 to 2250 mm)** high.
 - 3) Five anchors per jamb from **90 to 96 in (2250 to 2400 mm)** high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each **24 in (600 mm)** or fraction thereof above **96 in (2400 mm)** high.
 - 5) Two anchors per head for frames above **42 in (1050 mm)** wide and mounted in metal-stud partitions.
 - b. Masonry Type: Locate anchors not more than **18 in (450 mm)** from top and bottom of frame. Space anchors not more than **32 in (800 mm)** on centers and as follows:
 - 1) Two anchors per jamb up to **60 in (1500 mm)** high.
 - 2) Three anchors per jamb from **60 to 90 in (1500 to 2250 mm)** high.
 - 3) Four anchors per jamb from **90 to 120 in (2250 to 3000 mm)** high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each **24 in (600 mm)** or fraction thereof above **120 in (3000 mm)** high.
 - c. Postinstalled Expansion Type for In-Place Concrete or Masonry: Locate anchors not more than **6 in (150 mm)** from top and bottom of frame and not more than **26 in (650 mm)** on centers.
- J. Floor Anchors: Formed from same material as frames welded to bottom of jambs and mullions with not less than 4 spot welds, not less than **0.0428 in (1.10 mm)** (18 gage) thick, and as follows, terminating bottom of frames at finish floor surface:
- 1. Monolithic Concrete Slabs: Clip type anchors, with two holes to receive fasteners.
 - 2. Separate Topping Concrete Slabs: Adjustable type anchors with extension clips, allowing not less than **2 in (50 mm)** height adjustment.
- K. Shipping Spreader Bars: Attach two removable metal spreader bars across bottom of frames, tack welded to jambs and mullions.
- L. Door Silencers: Except on weatherstripped doors, drill holes to receive door silencers furnished under Division 08 Section Door Hardware. Keep holes clear during construction.
- 1. Single-Door Frames: Strike jamb for 3 door silencers.

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2.6 STEEL FINISHES

- A. Comply with NAAMM's Metal Finishes Manual for Architectural and Metal Products for recommendations for cleaning, treating, priming, and when specified, finishing.
- B. Finish products specified in this Section after fabrication.
- C. Metallic-Coated Steel Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to primer to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - 1. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- D. Non-Coated Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, Solvent Cleaning; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 3, Power Tool Cleaning, or SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning.
- E. Prime Coat Finish: Apply manufacturer's standard primer specified below immediately after surface preparation and pretreatment.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- F. Field-Applied Coatings: As specified in Division 09 Section Painting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. ANSI/NAAMM-HMMA 840.
 - 2. NFPA 80 for fire-rated doors and frames.
 - 3. NFPA 105 for smoke control doors and frames.
 - 4. DHI A115.IG.
 - 5. Respective manufacturer's written installation instructions.
 - 6. Accepted submittals.

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7. Contract Documents.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Pre-Installation Tolerances: Prior to installation, adjust and securely brace hollow metal frames for squareness, alignment, twist, and plumbness to following:
1. Squareness: Plus or minus **1/16 in (1.5 mm)**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 2. Alignment: Plus or minus **1/16 in (1.5 mm)**, measured at jambs on a horizontal line parallel to plane of wall.
 3. Twist: Plus or minus **1/16 in (1.5 mm)**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 4. Plumbness: Plus or minus **1/16 in (1.5 mm)**, measured at jambs on a perpendicular line from head to floor.
- C. Hardware Preparation: Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.4 INSTALLATION OF HOLLOW METAL DOORS AND FRAMES

- A. Hollow Metal Frames: Install hollow metal frames of size and profile indicated.
1. Setting: Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and welded-in shipping spreader bars. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
 - a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - b. Install frames with removable glazing stops located on secure side of opening.
 - c. Install door silencers in frames before grouting.
 - d. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors or powder actuated fasteners.
 3. Sound-Rated Partitions: Solidly pack mineral-fiber insulation behind frames.
 4. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
 5. Installation Tolerances: Adjust hollow metal frames for squareness, alignment, twist, and plumb to following:

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- a. Squareness: Plus or minus **1/16 in (1.5 mm)**, measured at rabbet on a line 90 degrees from jamb perpendicular to frame head.
- b. Alignment: Plus or minus **1/16 in (1.5 mm)**, measured at jambs on a horizontal line parallel to plane of wall.
- c. Twist: Plus or minus **1/16 in (1.5 mm)**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
- d. Plumbness: Plus or minus **1/16 in (1.5 mm)**, measured at jambs at floor.

B. Glazing:

1. Comply with installation requirements in Division 08 Section Glazing.
2. Secure stops with countersunk flat or oval head machine screws spaced uniformly not more than **6 in (150 mm)** on center and not more than **2 in (50 mm)** on centers from each corner.

3.5 ADJUSTMENTS

- A. Final Adjustments: Remove and replace defective hollow metal work, including work that is warped, bowed, or otherwise unacceptable.
- B. Prime Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of primer compatible with paint specified in Division 09 Section "Painting".
- C. Field-Applied Coatings: As specified in Division 09 Section Painting.

END OF SECTION

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SECTION 08 1416

PREFINISHED FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Prefinished flush wood doors and supplementary items necessary for installation.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
 2. Include details of core and edge construction, light frames, and trim for openings.
 3. Include factory-finishing specifications.
 4. Include manufacturer's surface preparation instructions.
 5. Indicate scheduled fire doors that cannot qualify for labeling because of design, size, hardware or other reason.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work. Provide dimensioned drawings indicating location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
1. Indicate dimensions and locations of mortises and holes for hardware.
 2. Indicate dimensions and locations of cutouts.
 3. Indicate requirements for door face matching.
 4. Indicate doors to be factory finished and finish requirements.
 5. Indicate fire-protection-ratings for fire-rated doors.
- C. Samples for Verification Purposes: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Plastic Laminate Doors: Plastic laminate door facing, 6 in (150 mm) square, for each color, texture, and pattern selected.
 2. Corner sections of doors, approximately 8 in by 10 in (200 mm by 250 mm), with door faces and edges representing actual materials to be used.
 - a. Plastic Laminate Doors: Samples for each color, texture, and pattern of plastic laminate door facing required.
 - b. Finish door facing samples with same materials proposed for factory-finished doors.
 3. Light Frames: Frames for light openings, 6 in (150 mm) long, for each material, type, and finish required.

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1.3 INFORMATIONAL SUBMITTALS

A. Warranty:

1. Provide manufacturer's written warranty covering materials and installation (labor) stating obligations, remedies, limitations and exclusions.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.

1.5 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with requirements of referenced quality standards and manufacturer's written instructions.

1. Package doors individually.
2. Protect doors during transit, storage and handling to prevent damage, soiling and deterioration.
3. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Deliver and install doors only when spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.8 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

1.9 WARRANTY

- A. Manufacturer's Warranty: Furnish manufacturer's written material and labor warranty signed by an authorized representative using manufacturer's standard form agreeing to furnish materials and labor required to repair or replace work which exhibits material defects caused by manufacture or design and installation of product. Warranty shall also include finishing that may be required due to repair or replacement of defective doors. "Defects" is defined to include but not limited to deterioration or failure to perform as required.

1. Defects include, but are not limited to, the following:
 - a. Warping (Bow, Cup, or Twist): Not more than **1/4 in (6 mm)** in a **42 by 84 in (1050 by 2100 mm)** section.
 - b. Telegraphing of Core Construction: Not more than **0.01 in in a 3 in (0.25 mm in a 75 mm)** span in face veneers.

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2. Warranty Period: Manufacturer shall warrant the products to be free from material and labor Defects for a period as follows:
 - a. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
 1. Algoma Hardwoods, Inc.
 2. Construction Specialties, Inc. (C/S Group)
 3. Eggers Industries.
 4. Marshfield Door Systems, Inc.
 5. Mohawk Flush Doors, Inc.; a Masonite Company.
 6. Oshkosh Architectural Door Company.
 7. VT Industries Inc.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.3 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 1. Fire Resistance Ratings: Products and construction identical to assemblies tested for fire resistance according to NFPA 252 or UL 10C and included under Category GSZN, Category A, published in Underwriters Laboratories, Inc. (UL) "Fire Resistance Directory"; or listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Positive Pressure Testing: After 5 minutes into test, neutral pressure level in furnace shall be established at 40 in (1000 mm) or less above sill.
 3. Availability: If specified as fire-rated and labeled door can be obtained from one manufacturer, no consideration will be given to those manufacturers who are not authorized to manufacture such doors.
 4. Smoke-Control Door Assemblies: Comply with UL 1784.

2.4 DOOR CONSTRUCTION, GENERAL

- A. Product Quality Standard: In addition to standard listed elsewhere, comply with following, unless otherwise specified, for construction, finishes, installation, and other requirements.
 1. Quality Standard: Comply with "Architectural Woodwork Standards".

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- a. 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.
 - b. Typical Doors: WDMA I.S.1-A Performance Grade: Heavy Duty, minimum.
- B. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- C. Particleboard Core Doors:
1. Particleboard: ANSI A208.1, Grade LD-2.
 2. Blocking: Provide wood blocking as needed to eliminate through-bolting hardware and as follows:
 - a. Top Rail: 5 in (125 mm).
 - b. Bottom Rail: 5 in (125 mm).
 - c. Mid Rail: 5 in (125 mm), in doors indicated to have exit devices.
 - d. Lock Blocks: 5 in by 10 in (125 mm by 250 mm), one for lock and two for exit devices.
- D. Fire-Protection-Rated Doors: Mineral core as required for fire-protection-rating indicated.
1. Edge: Construction with intumescent seals; where positive pressure fire testing is required, edge construction with intumescent seals concealed by outer stile matching door face material and laminated backing at hinge stiles for improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 2. Pairs: Fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Comply with specified requirements for exposed edges.
- E. Structural Composite Lumber Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.
 2. Screw Withdrawal, Face: 700 lbf (3100 N).
 3. Screw Withdrawal, Edge: 400 lbf (1780 N).
- F. 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 fire resistant composite blocking with improved screw-holding capability approved for use in doors of fire-protection-ratings indicated as needed to eliminate through-bolting hardware and as follows:
 - a. Top Rail: 5 in (125 mm).
 - b. Bottom Rail: 5 in (125 mm).
 - c. Mid Rail: 5 in (125 mm), in doors indicated to have exit devices.
 - d. Lock Blocks: 5 in by 10 in (125 mm by 250 mm), one for lock and two for exit devices.
- G. Lead-Lined Wood Doors: Solid-core, 5 ply flush bonded core construction with one or more continuous lead sheets to make up total lead thickness.

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1. Core: Solid glued wood block or solid particleboard, glued to top and bottom rails and edge stiles. Lead lining may be constructed in the core or between the core and faces, at manufacturer's option.
2. Lead Lining: Extend lead sheet continuously from top to bottom and edge to edge. Assemble lead lining and core with poured lead fasteners or steel bolts. Space lead fasteners not more than 1-1/2 in (38 mm) from door edge and approximately 8 in (200 mm) on center. Countersink bolt heads and cover with poured lead.
3. Lead Thickness: Same as specified for walls in Division 13 Section "Radiation Protection".
4. Shield cutouts for locksets with sheet lead of the same thickness used in door. Lap lining of cutouts with the door lining.
5. Provide lead-lined astragals for pairs of doors.
6. 20 minute UL- or Warnock Hersey-labeled, where scheduled.

2.5 PLASTIC LAMINATE FACED DOORS

A. Interior Solid-Core Doors:

1. Grade: Premium.
2. Plastic Laminate Door Faces:
 - a. Product Quality Standard: NEMA LD 3, Grade HGS.
 - b. Description: High-pressure decorative laminates, 0.048 in (1.2 mm) minimum thickness.
3. Plastic Laminate Selection: As scheduled or as indicated in Design Selections.
4. Exposed Vertical and Horizontal Edges: Plastic laminate that matches faces, applied before faces.
5. Core: Particleboard or mineral core as required by application.
6. Construction:
 - a. Non-Fire-Rated and Fire-Rated (20 minute): 3 plies.
 - 1) Stiles and rails bonded to core.
 - 2) Entire unit abrasive planed before faces are applied.
 - 3) Faces bonded to core using a hot press.
 - b. Fire-Rated (45 minute and higher): 5 plies.
 - 1) Stiles and rails bonded to core.
 - 2) Entire unit abrasive planed before faces and crossbands are applied.
 - 3) Faces bonded to core using a hot press.

2.6 FABRICATION OF PREFINISHED FLUSH WOOD DOORS

- ### A. Fabrication Quality Standards: In addition to standards listed elsewhere, comply with following, unless otherwise specified:
1. NFPA 80 for fire-rated doors.
 2. DHI-WDHS-3 and DHI A115-W series standards for hardware.

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- B. Factory Fitting: Factory fit doors to suit frame opening sizes indicated according to installation quality standards. Do not trim stiles and rails in excess of limits permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining with seal coat.
- C. Hardware:
 - 1. Factory machine doors for hardware that is not surface applied according to installation quality standards.
 - 2. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 3. For doors scheduled to have electrical locks, provide built-in 1/4 in (6 mm) diameter raceway through doors, from lockset location to nearest hinge location, for low voltage wiring for doors scheduled to have electric locks.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.
 - 1. Verify that 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.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. NFPA 80 for fire-rated doors.
 - 2. NFPA 105 for smoke control doors.
 - 3. Respective manufacturer's written installation instructions.
 - 4. Accepted submittals.
 - 5. Contract Documents.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

3.4 INSTALLATION OF FLUSH WOOD DOORS

- A. Factory-Fitted Door Clearances: Fit accurately in frames, within following clearances for all doors (smoke control, fire-rated, and non-fire-rated):

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1. Jamb and Head: 1/8 in (3 mm) maximum.
 2. Between Edges of Pairs of Doors: 1/8 in (3 mm) maximum.
 3. Between Bottom of Door and Top of Threshold: Maximum 3/8 in (10 mm).
 4. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 in (19 mm).
 5. Between Bottom of Door and Top of Finish Surface (No Threshold) when the bottom of the door is more than 38 in (965 mm) above the finished floor: Maximum 3/8 in (10 mm) or as specified by the manufacturer's label service procedure.
- B. Hardware: As specified in Division 08 Section "Door Hardware".
- C. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.
- 3.5 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

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SECTION 08 3113

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Access doors and frames and supplementary items necessary for installation.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work.
- C. Ceiling Coordination Drawings for Access Doors at Ceilings: Furnish reflected ceiling plans, drawn to scale, on which ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other. Indicate method of attaching door frames to surrounding construction.
- D. Samples for Verification Purposes: For each door face material, at least 3 in by 5 in (75 mm by 125 mm) in size, in specified finish.
- E. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
1. NFPA 252 or UL 10B for vertical access doors and frames.
 2. ASTM E 119 or UL 263 for horizontal access doors and frames.
- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

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1.5 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.
- B. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".

1. Metal Doors and Frames:

- a. Acudor Products, Inc.
- b. Babcock-Davis.
- c. Dur-Red Products.
- d. J. L. Industries, Inc.
- e. Karp Associates, Inc.
- f. Larsen's Manufacturing Company.
- g. Maxam Metal Products, Ltd.
- h. Milcor Inc.
- i. Nystrom, Inc.
- j. Williams Brothers Corporation of America.

- B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.3 STEEL MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36 / A 36M.

- 1. ASTM A 123 / A 123M, for galvanizing steel and iron products.
- 2. ASTM A 153 / A 153M, for galvanizing steel and iron hardware.

- B. Steel Sheet: Uncoated cold-rolled steel sheet substrate complying with ASTM A 1008 / A 1008M, Commercial Steel (CS), exposed.

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- C. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning", to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning", or SSPC-SP 8, "Pickling".
 2. Surface Preparation for Metallic-Coated (Galvanized) Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
 3. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.
- D. Drywall Beads: Edge trim formed from 0.0299 in (0.7 mm) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.4 STAINLESS-STEEL MATERIALS

- A. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316. Remove tool and die marks and stretch lines or blend into finish.
1. Finish: Directional No. 4 Satin Finish.

2.5 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Non-rated Flush Access Doors and Frames with Exposed Trim:

1. Locations:
 - a. Ceramic tile wall surfaces.
2. Fabricated from one of the following as scheduled at the end of this Section.
 - a. Stainless-steel sheet.
3. Door: Minimum 0.075 in (1.9 mm) thick sheet metal, set flush with exposed face flange of frame.
4. Frame: Minimum 0.060 in (1.5 mm) thick sheet metal with 1-1/4 in (32 mm) wide, surface-mounted trim.
5. Hinges: Continuous piano.
6. Lock: Key-operated cylinder.
7. Size: 12 in by 12 in (300 mm by 300 mm); unless otherwise indicated.
8. Basis of Design: Nystrom Building Products, Model NT.

- B. Non-rated Flush Access Doors and Trimless Frames:

1. Locations: Wall and ceiling surfaces as scheduled.

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- a. Gypsum board wall and ceiling surfaces.
 - b. Plaster wall and ceiling surfaces.
2. Fabricated from one of the following as scheduled at the end of this Section.
- a. Steel sheet.
3. Door: Minimum **0.075 in (1.9 mm)** thick sheet metal, set flush with surrounding finish surfaces.
4. Frame: Minimum **0.060 in (1.5 mm)** thick sheet metal with drywall bead flange.
5. Hinges: Continuous piano.
6. Lock: Key-operated cylinder.
7. Size: **12 in by 12 in (300 mm by 300 mm)**; unless otherwise indicated.
8. Basis of Design: Nystrom Building Products, Model NW or NP as applicable.
- C. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim:
1. Locations:
 - a. Ceramic tile wall surfaces.
 2. Fabricated from one of the following as scheduled at the end of this Section.
 - a. Steel sheet.
 - b. Stainless-steel sheet.
 3. Fire-Resistance Rating: Not less than 1-1/2 hours.
 4. Temperature Rise Rating: **250 deg F (139 deg C)** at the end of 30 minutes.
 5. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of **0.036 in (0.9 mm)**.
 6. Frame: Minimum **0.060 in (1.5 mm)** thick sheet metal with **1 in (25 mm)** wide, surface-mounted trim.
 7. Hinges: Continuous piano.
 8. Automatic Closer: Spring type.
 9. Latch: Self-latching device operated by flush key with interior release.
 10. Size: **12 in by 12 in (300 mm by 300 mm)**; unless otherwise indicated.
 11. Basis of Design: Nystrom Building Products, Model IT.
- D. Fire-Rated, Insulated, Flush Access Doors and Trimless Frames:
1. Locations:
 - a. Gypsum board wall and ceiling surfaces.
 2. Fabricated from one of the following as scheduled at the end of this Section.
 - a. Steel sheet.
 3. Fire-Resistance Rating: Not less than 1-1/2 hours.
 4. Temperature Rise Rating: **250 deg F (139 deg C)** at the end of 30 minutes.
 5. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of **0.036 in (0.9 mm)**.

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6. Frame: Minimum 0.060 in (1.5 mm) thick sheet metal with drywall bead.
7. Hinges: Continuous piano.
8. Automatic Closer: Spring type.
9. Latch: Self-latching device operated by flush key with interior release.
10. Size: 12 in by 12 in (300 mm by 300 mm); unless otherwise indicated.
11. Basis of Design:

- a. Gypsum Board: Nystrom Building Products, Model IW.

2.6 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 panels to types of supports indicated.
 1. Gypsum Board Locations: For trimless frames 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 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 lock, furnish two keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 1. Respective manufacturer's written installation instructions.
 2. Accepted submittals.
 3. Contract Documents.

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3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

3.4 INSTALLATION OF ACCESS DOORS AND FRAMES

- A. Frames with Masonry Anchors: Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.5 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

3.6 ACCESS DOOR SCHEDULE

- A. Provide access doors where indicated on the drawings and as follows:
 - 1. Steel Access Doors:
 - a. Concealed valves and controls for plumbing and HVAC.
 - b. Fire dampers above non-accessible ceilings.
 - c. Motor operated doors and grilles above non-accessible ceilings.
 - 2. Fire-Rated Steel Access Doors:
 - a. Rated walls and ceilings.
 - 3. Stainless Steel Access Doors:
 - a. Ceramic tile and other damp locations.

END OF SECTION

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SECTION 08 7100

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Items commercially known as finish or door hardware required for operation of doors, and accessories necessary to complete installation.
- B. Products Furnished But Not Installed Under this Section: Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
 - 1. Cylinders for locks. (Owner Furnished)

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each item of door hardware indicated, specified, or required.
- B. Including material descriptions, dimensions of individual components and profiles, finishes, and installation instructions.
 - 1. Index product data sheets according to hardware schedule by use of numbers or letters, or combination.
- C. Shop Drawings for Electrified Hardware:
- D. Wiring Diagrams: Indicate power, signal, and control wiring detailed in following forms distinguishing between manufacturer-installed and field-installed wiring:
 - 1. System schematic.
 - a. Point-to-point wiring diagrams.
 - b. Riser diagrams.
 - c. Door elevations.
 - 2. Interface: Details between electrified hardware and fire alarm, access control, security, and building control system.
 - 3. Sequence of Operation: Narrative operation description of doors controlled by electrified hardware.
- E. Hardware Set Schedules: Prepared by suppliers AHC detailing fabrications and assembly of door hardware, as well as procedures and diagrams. Coordinate hardware sets with doors, frames, and related Work to ensure proper size, thickness, hand, function, and finish of item.
- F. Format: Use same numbering shown on Drawings and Schedules.
 - 1. Content: Organize into hardware sets indicating designations of each item required for each door or opening. Include following information:
 - 2. Type, style, function, size, and finish of each item.

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- 1) Manufacturer and product number of each item.
 - 2) Fastenings and other pertinent attachment information.
 - 3) Location of each set cross referenced to room name and number in which door serves.
 - 4) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 5) Mounting locations for hardware.
 - 6) Door and frame sizes and materials.
3. Additional Specific Information: Include type of strike plates; length of spindle, hand, backset and bevel of locks; hand and degree opening for closers; length of kickplates; length of rods for flush bolts; type of door stop; and other functions of mechanisms.
- G. Keying Schedule: Submit indicating Owner's instructions for keying of locks.
- 1.3 INFORMATIONAL SUBMITTALS
- A. Product Certification for Electrified Hardware: Written data from product manufacturer certifying electrified hardware is approved for use on types and sizes of labeled fire rated doors comply with listed fire rated door assemblies.
 - B. Product Test Reports: Written reports for extended cycle testing based on evaluation of comprehensive tests performed by manufacturer or other qualified testing facility and witnessed by a qualified testing agency, for locksets, exit devices and closers.
 - C. Manufacturers Project Acceptance Document: Certification that products are approved, acceptable, or suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that warranty will be issued.
- 1.4 CLOSE-OUT SUBMITTALS
- A. Operation and Maintenance Data: For inclusion in operation and maintenance manual required by Division 01, submit manufacturer's instructions for operation and maintenance of installed Work, including methods and frequency recommended for maintaining optimum condition under anticipated use. Include precautions against cleaning materials and methods which may be detrimental to finishes and performance.
 - B. Operational and Maintenance Training: Training materials, including instructor qualifications, required by Close-Out Activities Article.
 - C. Maintenance Tools and Instructions: Furnish complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- 1.5 FIELD QUALITY CONTROL
- A. Engage qualified, independent, Door Hardware Institute (DHI) Certified, Fire Door Assembly Inspector (CFDAI) or Architectural Hardware Consultant (AHC) to perform inspections, prepare inspection reports, and issue inspection reports.
 1. Representative 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.
 2. Representative will inspect fire rated doors and state in report whether installed work complies with NFPA 80.

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1.6 QUALITY ASSURANCE

A. Supplier Qualifications:

1. Experience: Architectural door hardware supplier that has record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
2. Staff Hardware Expertise: Experienced professional currently certified by DHI as AHC, CDC, and EHC, and experienced in door hardware installations that are comparable in material, design, and extent to this Project that will be responsible for following activities:
 3. Preparation of submittals, including hardware set schedules.
 - a. Available for consultation to Owner, Architect, and Contractor during course of Work.
 - b. Finalizing keying requirements with Owner.
4. Electro-Mechanical or Electronic Hardware: When supplied, technician, with minimum of 5 years of experience in low voltage installation, shall be available for assistance to Owner, Architect, Contractor, and Installer.

B. Installer Qualifications:

1. Experience: Company with not less than 10 years of experience in performing specified Work similar to scope of this Project; with a record of successful in-service performance; and sufficient capability, facilities and personnel, to produce required Work.
2. Supervision: Installer shall maintain a competent supervisor who is at Project during times specified Work is in progress, and, who is experienced in installing systems similar to type and scope required for Project.
3. Manufacturer Training: Technical representatives of manufacturer of locksets, exit devices and closers shall train Installer's installation personnel (supervisor and installers), either at Project or at manufacturers facility, on following:
 4. Proper installation of products.
 - a. Proper sequence of installation of Work.
 - b. Situations that require special attention or care during installation.
 - c. Situations and conditions that should be avoided.
 - d. Other topics relevant to installation.

C. Pre-Construction Extended Performance Testing: Manufacturer shall, through its own laboratory testing facilities witnessed and verified by Intertek, Underwriters Laboratories, Inc., or other testing laboratory agency acceptable to Architect, perform pre-construction testing to establish compliance of proposed Work with specified requirements.

D. General Requirements: Test hardware items identified in PART 2 for extended cycle performance.

1. Test Method: ANSI/BHMA Grade 1.
2. Reports: Prepare certified reports tabulating test results and indicating if hardware items meet or exceed requirements.
3. Equivalent Option to Testing: Testing not required if manufacturers has tested hardware items within previous 5 years.

E. Keying Conference: Before beginning Work of this Section, conduct conference at Project to comply with requirements of applicable Division 01 Sections. Incorporate keying conference

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decisions into final keying schedule.

- F. Required Attendees:
 - a. Owner.
 - b. Architect.
 - c. Contractor, including supervisor.
 - d. Supplier's architectural hardware consultant.
 - e. Hardware installer, including supervisor.
 - f. Owner's Security installer, including supervisor.
 - g. Manufacturer's technical representative.

- G. Minimum Agenda:
 - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Address for delivery of keys.

- H. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

- I. Pre-Installation Conference: Before beginning Work of this Section, conduct conference at Project to comply with requirements of applicable Division 01 Sections.

- J. Required Attendees:
 - a. Architect.
 - b. Contractor, including supervisor.
 - c. Supplier's architectural hardware consultant.
 - d. Hardware installer, including supervisor.
 - e. Owner's Security installer, including supervisor.
 - f. Manufacturer's technical representative.

- K. Minimum Agenda: Installer shall demonstrate understanding of Work required by reviewing and discussing procedures for, but not limited to, following:
 - a. Tour representative areas of required Work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of installation and other preparatory Work performed by other installers.
 - b. Review Contract Document requirements.
 - c. Review approved submittals.
 - d. Review installation procedures, including, but not limited to, following:
 - 1) Sequence of operation for each type of electrified door hardware
 - 2) Relationships between electrified hardware and fire alarm, access control, security, and building control system.
 - e. Installation requirements for each hardware item.

 - f. Review required inspection, testing, certifying, and material usage accounting procedures.
 - g. Review forecasted weather conditions and procedures for coping with unfavorable conditions.

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- L. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

1.7 WARRANTY

- A. Manufacturer's Special Warranty: Furnish labor and material warranty for following time periods from date of substantial completion agreeing to repair or replace defects, faulty Work and failures, signed by authorized representative using manufacturer's standard form.
 - 1. Mortise Locksets: 5 years on mechanical components with 2 years on electrical components.
 - 2. Exit Devices: 5 years on mechanical components with 2 years on electrical components.
 - 3. Overhead Manual Closers: 10 years.
 - 4. Floor Closers: 5 years.
 - 5. Electrified Hardware: 2 years
 - 6. Electromagnetic and Delayed-Egress Locks: 5 years.
- B. Require Third Party Inspection on all Life Safety Doors for NFPA compliance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 01 Sections.
- B. Basis of Design: Contract Documents are based on products specified in PART 3 "Door Hardware Sets" Article below to establish a standard of quality. Other listed manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and does not change intent of Contract Documents as judged by Architect.

2.2 HARDWARE, GENERAL

- A. Single Source Responsibility: Furnish each type of hardware unit from single manufacturer. Electrified door hardware shall be from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and are listed by testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- B. Manufacturer's Nameplate: Hardware units shall not have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire rated labels; manufacturer's identification is permitted on rim of lock cylinders only.
- C. Base Metals: Hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- D. Fasteners: Hardware units manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners

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are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

- E. Concealed Fasteners: Hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is only means of securely attaching hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 1. Steel Machine or Wood Screws: For following fire rated applications:
 - a. Mortise hinges to doors.
 - b. Strike plates to frames.
 - c. Closers to doors and frames.
 - 2. Steel Through Bolts: For following fire rated applications unless door blocking is provided:
 - a. Surface hinges to doors.
 - b. Closers to doors and frames.
 - c. Surface mounted exit devices.
 - 3. Spacers or Sex Bolts: For through bolting of hollow metal doors.
 - 4. Fasteners for Wood Doors: DHI WDHS.2.
- F. Fire-Test-Response Characteristics:
 - 1. Fire Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
 - 2. Test Pressure: After 5 minutes into test, neutral pressure level in furnace shall be established at 40 in (1000 mm) or less above sill.
 - 3. UL Stickers to be taken off the non-rated doors.
- G. Accessibility Requirements: Hardware units and installation shall comply with Americans with Disabilities Act (ADA), ANSI A 117.1, and state and local accessibility standards.
- H. Electrical Requirements: Furnish electrical products that are listed and classified by UL as suitable for purpose specified and indicated.
 - 1. Electrified Functions: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle.
 - 2. Concealed Plug Connectors: Termination of multi-wire bundles up to 8 conductors shall be by 8 position concealed plug connector or by 8 position and 4 position connector for 12 wire applications.
 - 3. Fail Safe in case of power loss.

2.3 BUTT HINGES

- A. Product Quality Standard: ANSI/BHMA A 156.1, Grade 1, 2 or 3.
- B. Description:

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1. Generic Type: Full-mortise, concealed bearings.
 2. Weight:
 3. Doors with Closers: Heavy anti-friction bearing.
 - a. Doors without Closers: Standard plain bearing.
 4. Hinge Pins: Except as otherwise indicated, hinge pins as follows:
 5. Out-Swing Exterior Doors: Non-removable pins (NRP) or safety stud.
 - a. Out-Swing Corridor Doors with Locks: Non-removable pins (NRP) or safety stud.
 - b. Interior Doors: Non-rising pins.
 - c. Top Tips: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.
 - d. Bottom Tips: Hole in bottom for easy pin removal.
- C. Templates: Except for hinges to be installed entirely (both leaves) into wood doors and wood frames, provide only template-produced units.
- D. Screws: Phillips flat-head screws with heads to match surface of hinges.
- E. Metal Doors and Metal Frames: Machine screws installed into drilled and tapped holes.
 1. Wood Doors and Wood Frames: Wood screws.
 2. Fire Rated Wood Doors: No. 12 by 1-1/4 in (32 mm), threaded-to-head steel wood screws.
- F. Basis of Design, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- G. Manufacturers:
 1. Hager
 2. Ives
 3. McKinney
 4. Stanley
- 2.4 CONTINUOUS GEARED HINGES
- A. Product Quality Standard: ANSI/BHMA A 156.26, Grade 1, 2 or 3.
- B. Description: Extruded-aluminum, pinless, geared hinge leaves; joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings; type scheduled in PART 3 "Door Hardware Sets" Article. Steel pins to hold labeled fire rated doors in place if required by tested listing.
- C. Screws: Phillips flat-head screws with heads to match surface of hinges. Comply with following:
 1. Metal Doors and Metal Frames: Machine screws installed into drilled and tapped holes.
 2. Wood Doors and Wood Frames: Wood screws.
 3. Fire Rated Wood Doors: No. 12 by 1-1/4 in (32 mm), threaded-to-head steel wood screws.
- D. Basis of Design, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- E. Manufacturer:

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1. Ives Hardware
2. ABH

2.5 FLUSH BOLTS

A. Manual Flush Bolts:

1. Product Quality Standards:
 - a. ANSI/BHMA A 156.16.
 - b. Underwriters Laboratories, Inc. listed for fire doors.

B. Description:

1. Minimum 1/2 in (12 mm) round rods, forged brass or bronze, furnished in pairs, (top and bottom of door); lengths of rod 12 in (300 mm); where door is higher than 84 in (2.13 m), top bolt shall be of sufficient length to locate flush bolt operator 72 in (1.83 m) above finish floor.
 - a. Standard top strike and dustproof bottom strike.
2. Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
3. Manufacturers and Products:
 - a. Ives
 - b. Trimco

C. Automatic Flush Bolts:

1. Product Quality Standards:
 - a. ANSI/BHMA A 156.16.
 - b. Underwriters Laboratories, Inc. listed for fire doors.

D. Description:

1. Minimum 1/2 in (12 mm) round rods, forged brass or bronze, furnished in pairs, (top and bottom of door); lengths of rod 12 in (300 mm); where door is higher than 84 in (2.13 m), top bolt shall be of sufficient length to locate flush bolt operator 72 in (1.83 m) above finish floor.
 - a. Standard top strike and dustproof bottom strike.
2. Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
3. Manufacturers and Products:
 - a. Ives
 - b. Trimco

E. Constant Latching Flush Bolts:

1. Product Quality Standards:

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- a. ANSI/BHMA A 156.16.
- b. Underwriters Laboratories, Inc. listed for fire doors.

F. Description:

- 1. Constant latching flush bolt at top remaining engaged when active door is opened, retracting only when plunger on face of bolt is depressed.
 - a. Automatic flush bolt at bottom.
 - b. Standard top strike and dustproof bottom strike.
- 2. Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- 3. Manufacturers and Products:
 - a. Ives

2.6 CYLINDERS

- A. Cylinders/ IC Cores: ANSI/BHMA A 156.5, Grade 1 unless Grade 2 is indicated.
- B. Manufacturer and Product:
 - 1. Best (No Substitutions)

2.7 KEYING

- A. Interchangeable Core Cylinders including construction and permanent cores.
- B. Manufacturer and Product:
 - 1. Best (No Substitutions)

2.8 BORED LOCKSETS AND LATCHES

- A. Product Quality Standards: ANSI/BHMA A 156.2, Grade 1, except cycle testing shall be 2 million cycles minimum.
 - 1. NFPA 101 in means of egress.
 - 2. Underwriters Laboratories, Inc. listed for fire rated doors.
- B. Product Quality Standards: ANSI/BHMA A 156.2, Grade 1, except cycle testing shall be 1 million cycles minimum. Grade 2 may be used for certain applications as scheduled.
 - 1. NFPA 101 in means of egress.
 - 2. Underwriters Laboratories, Inc. listed for fire rated doors.
- C. Description:
 - 1. Bored Box Construction:
 - a. Interlocking construction between lockbody and latchbolt tube.
 - b. 2-3/4 in (69 mm) backset.

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- c. 2-1/4 in (56 mm) by 1 in (25 mm) front.
 - d. Minimum 1/2 in (12 mm) latchbolt throw, or as required for fire rated doors.
 - e. Provision to prevent lever from sagging.
 - 2. Strikes: Metal strike plate with metal or plastic strike box with extended lip to protect frame.
 - a. Single Swing Doors: Minimum lip projection necessary to project from trim.
 - b. Pairs of Doors: With or without astragal, lip projection not beyond face of lock style of inactive leaf.
 - D. Basis of Design, Function, Accessories, Lever Base Metal, Face Plate, Rose, and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
 - E. Manufacturer and Product:
 - 1. Best (No Substitutions)
- 2.9 EXIT DEVICES
- A. Product Quality Standards: ANSI/BHMA A 156.3, Grade 1, except extended cycle performance testing shall be 8 million cycles minimum.
 - 1. NFPA 101 in means of egress.
 - 2. Underwriters Laboratories, Inc. listed for fire rated doors.
 - 3. Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
 - 4. NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
 - B. Description:
 - 1. Touch bar type, unless scheduled otherwise.
 - 2. Concealed vertical rods on pairs of doors, unless surface mounted vertical rods required for fire rated doors.
 - 3. Mortise lock or rim type devices on single doors only.
 - 4. Outside trim as scheduled in PART 3 "Door Hardware Sets" Article.
 - 5. Except on fire rated doors where closers are provided on doors equipped with exit devices, equip units with keyed dogging device to keep latch bolt retracted, when engaged.
 - 6. Except at doors with thresholds, provide vertical rod devices which hold rods in retracted position when door is open.
 - C. Basis of Design, Function, Accessories, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
 - D. Manufacturers and Products:
 - 1. Von Duprin
 - 2. Sargent

2.10 ELECTROMAGNETIC LOCKS

- A. Product Quality Standard: ANSI/BHMA A 156.23.

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- B. Description: Full exterior or interior type, electrically powered electromagnet attached to frame and armature plate attached to door; strength ranking, inductive kickback peak voltage, and residual magnetism.
- C. Basis of Design, Function, Accessories, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- D. Manufacturers:
 - 1. Schlage Electronics
 - 2. Door Controls International

2.11 DELAYED EGRESS LOCKS

- A. Product Quality Standard: ANSI/BHMA A 156.24.
- B. Description: Full exterior or interior type, electrically powered electromagnet attached to frame and armature plate attached to door; strength ranking, inductive kickback peak voltage, and residual magnetism.
 - 1. Means of Egress Doors: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds, as required by NFPA 101.
 - 2. Security Grade: Activated from secure side of door by initiating device.
 - 3. Movement Grade: Activated by door movement as initiating device.
- C. Basis of Design, Function, Accessories, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- D. Manufacturers:
 - 1. Schlage Commercial Electronics
 - 2. Door Controls International

2.12 PUSH/PULL TRIM

- A. Product Quality Standard: ANSI/BHMA A 156.6.
- B. Description:
 - 1. Flat Push Plates: 0.050 in (1.3 mm) thick, 4 in wide by 16 in high (100 mm) wide by (400 mm) high); with square corners and beveled edges, secured with exposed screws.
 - 2. Pull-Plate Door Pulls: 0.050 in (1.3 mm) thick plate, 4 in wide by 16 in high (100 mm) wide by (400 mm) high), with square corners and beveled edges; 3/4 in (19 mm) constant-diameter pull, with minimum clearance of 1-1/2 in (38 mm) from face of door; fastened at 8 in (200 mm) o.c., secured with exposed screws.
- C. Basis of Design, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- D. Manufacturer:
 - 1. Ives
 - 2. Trimco

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2.13 CLOSERS

- A. Product Quality Standard: ANSI/BHMA A 156.4, Grade 1, except cycle testing shall be 6 million cycles minimum.
- B. Description: Manual overhead surface and concealed closers. Cast Iron body.
- C. Size of Units: Except as otherwise specifically indicated, comply with manufacturer's recommendations for size of door control unit depending on size of door, exposure to weather, and anticipated frequency of use.
- D. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible, provide adjustable units complying with accessibility requirements for door opening force and delayed action closing.
- E. Basis of Design, Function, Accessories, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- F. Surface Closers Manufacturer and Model Series:
 - 1. LCN (No Substitutions)

2.14 STOPS AND HOLDERS

- A. Product Quality Standard:
 - 1. Stops and Bumpers: ANSI/BHMA A 156.16, Grade 1.
 - 2. Overhead Stays: ANSI/BHMA A 156.16, Grade 1.
 - 3. Electromagnetic Door Holders: BHMA A 156.15; coordinate with fire detectors and interface with fire alarm system for fire rated doors.
 - 4. Door Silencers: ANSI/BHMA A 156.16.
- B. Basis of Design, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- C. Emergency Release Stops:
- D. Description: Retractable stop to permit doors to be opened in both directions without damage to frame for emergency rescue.
 - 1. Manufacturer and Product:
 - a. Ives
 - b. Trimco

2.15 PROTECTIVE TRIM UNITS

- A. Product Quality Standard: ANSI/BHMA A 156.6.
- B. Description: Minimum 0.050 in (1.25 mm) thick metal plates with beveled top and 2 sides fabricated in following configurations:
 - 1. Armor Plates: 36 in (900 mm) high by door width, with allowance for frame stops.

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2. Kick Plates: 10 in (250 mm) high by door width, with allowance for frame stops.
 3. Mop Plates: 6 in (150 mm) high by 1 in (25 mm) less than door width.
 4. Door Edging:
 - a. Angle: 7/8 in (21 mm) legs by 42 in (1050 mm) high mortised into door edge.
 - b. Cap: 7/8 in (21 mm) legs by thickness of door by 42 in (1050 mm) high mortised into door edge.
- C. Fasteners: Exposed fasteners consisting of either machine screws or self-tapping screws.
- D. Width and Thickness: As scheduled in PART 3 "Door Hardware Sets" Article.
- E. Basis of Design, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
- F. Manufacturer and Product:
1. Ives
 2. Trimco

2.16 DOOR GASKETING

- A. Product Quality Standards: ANSI/BHMA A 156.22, and according to following when required:
1. Air Leakage: Not to exceed 0.50 cfm/ft (0.000774 cu m/s/m) of crack length for gasketing other than for smoke control according to ASTM E 283.
 2. Smoke Leakage: Comply with NFPA 105 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated according to UL 1784.
 3. Fire Rating: Comply with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction according to NFPA 252. After 5 minutes into test, neutral pressure level in furnace shall be established at 40 in (1000 mm) or less above sill.
 4. Sound Rating: Listed and labeled by a testing and inspecting agency according to ASTM E 1408.
- B. Basis of Design: As scheduled in PART 3 "Door Hardware Sets" Article.
- C. Manufacturer:
1. Zero
 2. National Guard Products
 3. Reese

2.17 THRESHOLDS

- A. Product Quality Standard: ANSI/BHMA A 156.21.
- B. Basis of Design: As scheduled in PART 3 "Door Hardware Sets" Article.
- C. Manufacturer:
1. Zero

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2. National Guard Products

2.18 KEY CONTROL SYSTEM

A. Key Control Cabinet:

B. Product Quality Standard: BHMA A156.5, Grade 1.

1. Description: Metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of number of locks.
2. Multiple-Drawer Cabinet: Cabinet with drawers equipped with key-holding panels and key envelope storage, and progressive-type ball-bearing suspension slides. Include single cylinder lock to lock all drawers.

C. Manufacturers:

1. Key Control Systems
2. Lund Equipment Co
3. MMF Industries
4. Sunroc Corporation

D. Key Control System Software:

E. Product Quality Standard: BHMA A156.5, Grade 1.

1. Description: Multiple-index system for recording and reporting key-holder listings, tracking keys and lock and key history, and printing receipts for transactions. Include instruction manual.

2.19 MISCELLANEOUS DOOR HARDWARE

A. Boxed Power Supplies:

B. Description: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems.

1. Basis of Design, Function, Accessories, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.

C. Auxiliary Hardware:

D. Product Quality Standard: BHMA A156.16, Grade 1.

1. Basis of Design, Function, Accessories, Base Metal and Finish: As scheduled in PART 3 "Door Hardware Sets" Article.
2. Manufacturers:
 - a. Hager
 - b. Ives
 - c. Trimco

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- E. Silicone Sealant: Exterior non-sag silicone sealant as specified in Division 07 Section "Joint Sealants."

2.20 FINISHES

- A. Product Quality Standard: ANSI/BHMA A 156.18, as scheduled in PART 3 "Door Hardware Sets" Article.
- B. Protection: Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of range of approved samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine doors and frames to receive door hardware and associated Work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting Work within a particular area will be construed as acceptance of surface conditions.
- B. Any doors not listed without hardware set(s) should apply set C714 until clarified.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. Respective manufacturer written installation instructions.
 - 2. Accepted submittals.
 - 3. Contract Documents.
 - 4. ANSI/DHI A 115.IG.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Steel Doors and Frames: Comply with DHI A115 Series.
- C. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A 250.6.

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- D. Wood Doors: Comply with DHI A115-W Series.
- E. Electrical: Verify raceway system and other provisions for electrical power are adequate for electrified door hardware installation.

3.4 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.
- B. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
- C. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Hardware Installation:
 - 1. Set hardware items level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
 - 3. Do not install surface-mounted hardware items until finishes have been completed on substrates involved.
- E. Key Control System: Tag keys and place on markers and hooks in cabinet, as determined by final keying schedule.
- F. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room. Verify location with Architect. Provide one power supply for each door opening.
- G. Control Wiring:
 - 1. Raceways: As specified and provided under appropriate Division 26 Section.
 - 2. Connections: Coordinate with appropriate Division 28 Section.
- H. Thresholds: Set thresholds for exterior and acoustical doors in full bed of silicone sealant complying with requirements specified in Division 07 Section "Joint Sealants." Extend full width of opening and notch at door stops.

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Manufacturer's qualified technical representative shall periodically inspect Work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions, and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.
- B. Manufacturer's Technical Representative Qualifications: Direct employee of technical services department of manufacturer with experience in providing recommendations, observations, evaluations, and problem diagnostics.

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- C. Engage qualified, independent, Door Hardware Institute (DHI) Certified, Fire Door Assembly Inspector (CFDAI) or Architectural Hardware Consultant (AHC) to perform inspections, prepare inspection reports, and issue inspection reports.
- D. Representative 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.
- E. Representative will inspect fire rated doors and state in report whether installed work complies with NFPA 80.
- F. Inspection and testing must comply with NFPA 101-2012: 7.2.1.5.10.1; 7.2.1.2.11, NFPA 80-2010: 4.8.4; 5.2.1; 5.2.3; 5.2.6; 5.2.7; 6.3.1.7, NFP 105-2010: 5.2.1, EC.02.03.05, and EP 25 & EP 28

3.6 ADJUSTMENTS

- A. Post-Occupancy Adjustment: Approximately 6 months after date of substantial completion, qualified technicians of supplier or installer, accompanied by manufacturers technical representatives of locksets, exit devices, closers, and other hardware manufacturers as required, shall perform following Work:
 - 1. Examine and adjust each item of hardware as necessary to restore proper function of doors and hardware to comply with specified requirements.
 - 2. Replace hardware items that have deteriorated or failed due to faculty design, materials, or installation.
- B. Maintenance Service:
 - 1. First Year Maintenance Service: Beginning at date of substantial completion, supplier or installer shall provide 12 months maintenance service by qualified technicians.
 - 2. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper hardware operation.
 - a. Provide parts and supplies same as those used in manufacture and installation of original products.
- C. Proposal for Continuing Maintenance Service: Before expiration of first year maintenance service term, supplier shall furnish Owner with continuing maintenance service agreement, renewable yearly, proposing services, obligations, conditions, and terms for continuing maintenance service.

3.7 CLOSE-OUT ACTIVITIES

- A. Operational and Maintenance Training: Train Owner's personnel on maintenance, operation, and adjustment of door hardware at Project using factory-trained and certified technicians. Provide attendees with bound copies of training materials.

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3.8 HARDWARE SETS

Hardware Group No. 01

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7230F SET	630	IVE
1	EA	PASSAGE SET	93KON 14C	626	BES
1	EA	SURFACE CLOSER	4040XP RW/PA X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	SEALS	188S H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

END OF SECTION

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SECTION 08 8020

INTERIOR GLASS AND GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work required for this section includes glass, glazing and supplementary items necessary to complete the installation of interior glazing.

1.2 DEFINITIONS

- A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.

1.3 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Project Glazing Analysis: Prepared by manufacturer for primary glass or fabricator for fabricated glass units. Analyze each glass type and glazing condition for thermal, wind, impact and additional design loads indicated in glass performance requirements.
 - 1. Provide glass products in the thickness and strengths required to meet or exceed the criteria based on project loads and in-service conditions.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
- B. Source Limitations for Glass: Obtain glass from one manufacturer for each type of glass product indicated.
- C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- D. Safety Glass:
 - 1. Products Not Permitted: Wired Glass.
 - 2. Acceptable Products: Complying with CSPC 16 CFR 1201, Category II.
 - 3. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

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- E. Glazing Publications: Comply with published recommendations of glass product 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.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Specific product, material or manufacturer listed under each item below is "acceptable" only if manufacturer can evidence product compliance with requirements of Contract Documents.

2.2 PRIMARY FLOAT GLASS

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), and Quality q3 (glazing select), Class 1 (clear) unless otherwise as indicated in schedule.

1. Acceptable Manufacturers:

- a. AFG Industries
- b. Guardian Industries Corporation
- c. Pilkington Libbey-Owens-Ford
- d. PPG Industries, Inc. (PPG)

2.3 HEAT-TREATED FLOAT GLASS

- A. Fabrication Process: By horizontal (roller-hearth) process. Maintain maximum surface compression for heat strengthened glass of 7500 psi.

- B. Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Quality q3 (glazing select), kind and class as indicated below.

1. Kind HS (heat strengthened) where indicated or recommended by manufacturer to comply with system performance requirements specified.
2. Kind FT (fully tempered) where indicated or required for safety glazing.
3. Class 1 (clear) unless otherwise indicated in schedule.

2.4 ELASTOMERIC GLAZING SEALANTS

- A. Provide Medium-Modulus Neutral-Curing Silicone Glazing Sealant products complying with the following:

1. Acceptable Manufacturers and Products:

- a. Dow Corning; 795
- b. GE Silicones; Silglaze II
- c. Pecora Corporation; 895

2. Type and Grade: S (single component) and NS (nonsag).
3. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.
4. Use Related to Exposure: NT (nontraffic)

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5. Color: As selected from manufacturer's full range of colors.
- B. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will 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.
- C. 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.
- D. Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant including those referencing ASTM C 920 classifications for type, grade, class, and uses.
 1. Additional Movement Capability: Provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements in ASTM C 920 for uses indicated.

2.5 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

2.6 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. Cleaners, Primers, and Sealers: Types recommended by glazing material manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. 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.

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2.7 FABRICATION

- A. Fabricate glass and other glazing products in sizes required to glaze 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 standard, to comply with system performance requirements.

2.8 DECORATIVE GLASS FABRICATION

- A. Fabricate decorative glass and provide other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with product manufacturer's written instructions and with referenced glazing standard.
- B. Edge Finishing: Finish edges smooth and polished, without chips, scratches, or warps.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing 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.
 - 3. 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.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass and glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Provide glazing channel dimensions necessary for bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- 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. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

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- F. 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.
- G. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- H. Set tempered glass so that tong marks are concealed within frame or furnish horizontal tempered glass without tong marks.

3.4 INSTALLATION OF DECORATIVE GLAZING

- A. Set decorative glass units in each series true in line with uniform orientation, pattern, draw, bow, and similar characteristics.
- B. Set decorative glass in locations indicated on Drawings. Install glass with hardware and accessories according to hardware manufacturer's written instructions. Attach hardware securely to mounting surfaces.

3.5 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening. Do not remove release paper from tape until just before each glazing unit is installed.
- C. 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.

3.6 SEALANT GLAZING

- 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. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- C. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- D. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 PROTECTION AND CLEANING

- A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

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- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

3.8 GLASS SCHEDULE (Refer to Drawings)

3.9 GLAZING SCHEDULE

- A. Tape Glazing:
 - 1. Interior door glass lites
 - 2. Interior borrowed lights less than 75 united inches
- B. Sealant and Tape Glazing:
 - 1. Interior borrowed lights greater than 75 united inches.

END OF SECTION

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SECTION 09 2900

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Metal framing systems, interior gypsum board faced walls, partitions, and ceiling assemblies, and supplementary items necessary for installation.

1.2 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 for definitions of terms not defined in this Section or in other referenced quality standards.
- B. Damage: Stored or installed gypsum board materials shall be classified as defective and nonconforming Work if they have been exposed to wetness or dampness at any time prior to Substantial Completion or if they exhibit evidence of active or dormant mold or mildew.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
 - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Shop Drawings:
 - 1. Include scaled and dimensioned drawings showing locations of control joints.
 - 2. Gypsum Board Location Schedule: Provide detailed schedule in format similar to "Gypsum Board Schedule" at end of this Section indicating gypsum board products to be installed and their respective locations.

1.4 INFORMATIONAL SUBMITTALS

- A. Preconstruction Test Reports for Acoustical Sealant: Compatibility test reports from sealant manufacturer indicating that materials forming joint substrates and joint-sealant backings have been tested for compatibility with sealants; include sealant manufacturer's certification of test results for sealant compatibility and recommendations for primers and substrate preparation needed to obtain adhesion and prevent corrosion of substrate.

1.5 QUALITY ASSURANCE

- A. Mock-ups: Prior to fabrication and installation, build mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mock-up in the location and of the size indicated or, if not indicated, as directed by Architect. Contractor shall provide structural support framework.

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- a. Show typical components, attachments to building structure, and requirements of installation.
 - b. Field Samples for Gypsum Board Finishing: Build 10 ft (3 m) square gypsum board (attached to metal studs) area for each finish level specified. Include not less than one tapered-to-tapered edge gypsum board joint and cut edge-to-cut edge gypsum board joint.
2. Clean exposed faces of mock-up.
 3. Notify Architect seven days in advance of the dates and times when mock-up will be installed.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Protect accepted mock-up from the elements with weather-resistant membrane.
 6. Obtain Architect's acceptance of mockups before starting fabrication.
 7. Maintain mock-ups during construction in an undisturbed condition as a standard for review of the completed Work.
 8. Acceptance of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically noted by Contractor, submitted to Architect in writing, and accepted by Architect in writing.
 9. Demolish and remove mock-ups when directed by Architect unless accepted to become part of the completed Work.
- B. Fire Resistance Rated Assembly Characteristics: Provide materials and construction identical to those tested according to ASTM E 119/NFPA 251/UL 263 by one of following independent testing and inspecting agency as evidenced by design designation included in their associated approval manual:
1. UL - "Fire Resistance Directory", Category BXUV.
 2. GA 600 - "Fire Resistance Design Manual".
 3. Other agency acceptable to authorities having jurisdiction.
- C. Smoke Resistance Rated Assembly Characteristics: Provide materials and construction identical to those tested according to indicated fire resistance rated assemblies by independent testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Sound (STC) Resistance Rated Assembly Characteristics: Provide materials and construction identical to those tested according to ASTM E 90 and classified according to ASTM E 413 by independent and testing agency acceptable to authorities having jurisdiction.
- 1.6 PRE-INSTALLATION CONFERENCE
- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.
- 1.7 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.
- 1.8 PROJECT CONDITIONS
- A. Environmental Conditions: Comply with ASTM C 840 requirements or respective gypsum board manufacturer's written recommendations, whichever are more stringent.

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- B. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
- B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.3 PERFORMANCE REQUIREMENTS

- A. Dimensional Tolerances: Provide products and systems to accommodate dimensional tolerances of framing members and adjacent construction.

2.4 FRAMING FOR LEAD LINED DOORS

- A. Heavy-Duty Framing Systems (HDS) Headers and Jambs at Lead Lined Doors: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Heavy Duty Studs - HDS and Header Bracket - HDSC and accessories as required for a complete installation.
 - a. Minimum Base-Steel Thickness: 0.0538 inch (1.37 mm) or as indicated on drawings.
 - b. Web and Flange Widths, Type HDS: 3-5/8 by 3 by 1-1/16 by 3/4 inch (92.1 by 76.2 by 27.0 by 19.1 mm) or 6 by 3 by 2-1/4 by 3/4 inch (152 by 76.2 by 57.2 by 19.1 mm); as indicated on drawings.
 - c. Web and Flange Widths, Type HDSC: 3-1/2 by 3-1/16 by 2 inches (88.9 by 77.8 by 50.8 mm) or 5-7/8 by 3-1/16 by 2 inches (149 by 77.8 by 50.8 mm); as indicated on drawings.

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2. Slip-Type Head Joints: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to runners while allowing for vertical movement.
 - a. Basis of Design: ClarkDietrich Building Systems; Fast Top Clip FTC3 or FTC5.
3. Anchor Clips: Pre-punched, galvanized anchor clips designed for use in floor n conditions that provide a positive attachment of studs to runners while allowing for horizontal, torsional and vertical (uplift) loads.
 - a. Basis of Design: ClarkDietrich Building Systems; EasyClip T-Series, T685 or T683.

2.5 GYPSUM BOARD PRODUCTS

- A. Sizes: Maximum lengths and widths available that will minimize short edge-to-short edge butt joints and to correspond to support system indicated.
- B. Typical Paper-Faced Gypsum Board Products:
 1. Paper-Faced Type X Gypsum Board:
 - a. Material Quality Standard: ASTM C 1396 / C 1396M, Type X.
 - b. Description: Noncombustible fire resistant gypsum core with paper surfacing on face, back, and long edges; tapered long edges; 5/8 in (15 mm) thick.
 - c. Manufacturers and Products:
 - 1) American Gypsum Company; FireBloc Type X Gypsum Board.
 - 2) CertainTeed Corporation; Type X Gypsum Board.
 - 3) Georgia-Pacific Gypsum LLC; ToughRock Fireguard Gypsum Board.
 - 4) National Gypsum Company; Gold Bond Fire-Shield Gypsum board.
 - 5) United States Gypsum Company (USG); Sheetrock Firecode Core.
 2. Sustainable Paper-Faced Type X Gypsum Board: Preferred option, provide sustainable paper-faced Type X gypsum board or typical paper-faced Type X gypsum board.
 - a. Material Quality Standard: ASTM C 1396 / C 1396M, Type X.
 - b. Description: Noncombustible fire resistant gypsum core with paper surfacing on face, back, and long edges; tapered long edges; 5/8 in (15 mm) thick. UL Type Designation ULIX.
 - 1) ISO 14040 Environmental Management, Life Cycle Assessment, Principles and Framework:
 - a) Carbon emissions per Gypsum Association; Industry Standard Type III EPD for North American Type X wallboard with a manufacturing Global Warming Potential of 317.4 kg CO₂-eq./1000MSF.
 - b) Water reduction per Gypsum Association; Industry Standard Type III EPD for North American Type X wallboard having net use of fresh water value of 1.329 m³/1000 ft².
 - c) Primary Energy from non-renewable resources per Gypsum Association; Industry Standard Type III EPD for North American Type X wallboard have a value of 5,291 MJ/1000 ft².

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- c. Basis of Design:
 - 1) United States Gypsum Company, LLC, USG Sheetrock Brand EcoSmart Panels Firecode X.

C. Moisture-Resistant Gypsum Board Products:

1. Moisture-Resistant Paper-Faced Gypsum Board:

- a. Material Quality Standard: ASTM C 1396 / C 1396M, Type X.
- b. Description: Enhanced moisture-resistant, noncombustible gypsum core, with moisture-resistant paper surfacing on face, back and long edges; tapered long edges; score of 10 according to ASTM D 3273; 5/8 in (15 mm) thick.
- c. Manufacturers and Products:
 - 1) American Gypsum Company; M-Bloc Mold and Moisture Resistant Type X Gypsum Board.
 - 2) CertainTeed Corporation; M2Tech Moisture and Mold Resistant Type X Gypsum Board.
 - 3) National Gypsum Company; Gold Bond XP Gypsum Board.
 - 4) United States Gypsum Company (USG); Sheetrock Mold Tough Firecode Gypsum Board.

2. Moisture-Resistant Paperless Glass-Mat Gypsum Board:

- a. Material Quality Standard: ASTM C 1658 / C 1658M.
- b. Description: Enhanced moisture-resistant, noncombustible gypsum core with inorganic, embedded fiberglass mat on both faces; square edges; score or 10 according to ASTM D 3273; 5/8 in (15 mm) thick.
- c. Manufacturers and Products:
 - 1) Georgia-Pacific Gypsum LLC; DensArmor Plus Fireguard Interior Guard.
 - 2) National Gypsum Company; eXP Interior Extreme Gypsum Panels.

3. Moisture-Resistant Coated Glass-Mat Gypsum Board Products:

- a. Material Quality Standard: ASTM C 1178 / C 1178M.
- b. Description: Enhanced moisture-resistant, noncombustible, gypsum core with inorganic, embedded fiberglass mat on both sides; outside face coated with heat-cured copolymer water-resistant coating; square edges; score or 10 according to ASTM D 3273; 5/8 in (15 mm) thick.
- c. Manufacturers and Products:
 - 1) CertainTeed Corporation; Diamondback Tile Backer.
 - 2) Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 - 3) National Gypsum Company; eXP Tile Backer.

2.6 TRIM ACCESSORIES

A. Typical Drywall Trim Accessories:

- 1. Material Quality Standard: ASTM C 1047.

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2. Description: Trim profile fabricated of galvanized steel sheet; of size suitable for gypsum board thickness; with recessed, perforated flange formed to receive joint compound.
3. Trim Products:
 - a. Cornerbead:
 - 1) Purpose: For protecting outside (external) corners.
 - 2) Basis of Design: United States Gypsum Company (USG); Dur-A-Bead Corner Bead, 103.
 - b. Optional Equivalent Products – Structural Laminate Cornerbead System: At Contractor's option, provide high strength tapered co-polymer core cornerbead with tight fibered paperboard facing and joint tape paper backing.
 - 1) Purpose: For protecting outside (external) corners.
 - 2) Basis of Design: Structus Building Technologies; No-Coat Structural Laminate Drywall Corner System.
 - c. LC-Bead (J-Bead):
 - 1) Purpose: For protecting exposed edges of gypsum board where back flange can be used.
 - 2) Basis of Design: United States Gypsum Company (USG); J-Trim, 200-A.
 - d. L-Bead:
 - 1) Purpose: For protecting exposed edges of gypsum board where back flange cannot be used.
 - 2) Basis of Design: United States Gypsum Company (USG); L-Trim, 200-B.
 - e. J-Stop:
 - 1) Purpose: For protecting edges of gypsum board that does not require finishing.
 - 2) Basis of Design: United States Gypsum Company (USG); J-Stop, 402.
 - f. Control Joint:
 - 1) Description: One-piece trim formed with V-shaped slot, with removable strip covering slot opening.
 - 2) Purpose: For conditions requiring expansion and contraction stresses of large areas of gypsum board to be relieved.
 - 3) Basis of Design: United States Gypsum Company (USG); Control Joint, 093.
 - g. Other Trim or Special Shapes: Products as required by condition.
4. Manufacturers:
 - a. Dietrich Industries, Inc.; Unimast.
 - b. Fry Reglet Architectural Metals.
 - c. Marino Ware; Division of Ware Industries.

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- d. Niles Building Products Co.
- e. Superior Metal Trim; Division of Delta Star, Inc.
- f. United States Gypsum Company (USG).

B. Plastic Drywall Trim Accessories:

- 1. Description: Trim profile fabricated of high-impact PVC, of size suitable for gypsum board thickness; with recessed, perforated flange formed to receive joint compound.
- 2. Trim Products Profiles: As listed above in "Typical Drywall Trim Accessories".
- 3. Manufacturers:
 - a. Alabama Metal Industries Corporation; a Gibraltar Industries Company.
 - b. Phillips Manufacturing Co.
 - c. Plastic Components, Inc.
 - d. Trim Tex Drywall Products.
 - e. Vinyl Corp., a division of ClarkDietrich Building Systems.

C. Accent Trim Accessories:

- 1. Description: Extruded aluminum accessories of profiles and dimensions indicated of alloy and temper with not less than strength and durability properties of ASTM B 221, alloy 6063-T5.
- 2. Manufacturers:
 - a. Fry Reglet Architectural Metals.
 - b. Gordon, Inc.
 - c. Pittcon Industries.

2.7 FASTENERS

A. Limitations: Nails and staples are not permitted.

B. Gypsum Board Screws:

- 1. Material Quality Standards:
 - a. Metal Framing Members less than 0.03 in (0.75 mm) Thick: ASTM C 1002, Type S.
 - b. Metal Framing Members from 0.033 in to 0.112 in (0.79 mm to 2.9 mm) Thick: ASTM C 954, Type S-12.
- 2. Product Description - Standard Applications: Bugle head, self-drilling, self-tapping, steel screws with Phillips-head recess of size, holding power, and other properties recommended by respective gypsum board manufacturer; minimum 1 in (25 mm) long; with corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

C. Miscellaneous Fasteners: For conditions not indicated, fasteners shall be type, finish, size, and holding power recommended by respective gypsum board manufacturer and conditions.

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2.8 JOINT TREATMENT MATERIALS

- A. Material Quality Standard: ASTM C 475 / C 475M.
- B. Joint Tape:
 - 1. Paper Tape: Nominal 2 in (50 mm) wide cross-fibered paper tape with finish suitable for bonding, creased in center for easy folding, and compatible with joint compound.
 - 2. Mesh Tape: Nominal 2 in (50 mm) wide self-adhering 10-by-10 fiberglass mesh tape.
- C. Joint Compound:
 - 1. Setting-Type: Job-mixed powder for mixing with water, chemical-hardening compound; includes taping types.
 - 2. Drying-Type: Ready-mixed or job-mixed powder for mixing with water, air-drying, vinyl based compounds; includes taping, topping, and all-purpose types.

2.9 RELATED MATERIALS

- A. General: Provide auxiliary materials for gypsum board construction that comply with referenced quality standards and recommendations of gypsum board manufacturer.
- B. Firestopping Products at Penetrations: As specified in Division 07 Section "Penetration Firestopping".
- C. Fiberglass Sound Attenuation Blankets:
 - 1. Material Quality Standard: ASTM C 665, Type I.
 - 2. Description: Unfaced blankets produced by bonding inorganic glass fibers with a thermosetting binder; free of formaldehyde.
 - 3. Surface Burning Characteristics: According to ASTM E 84/NFPA 255/UL 723:
 - a. Flame Spread: Class A - no greater than 25.
 - b. Smoke Developed: No greater than 50.
 - 4. Thickness: Not less than 2-1/2 in (62 mm), unless otherwise indicated.
 - 5. Basis of Design: Johns Manville; Sound Control Batts, Formaldehyde Free.
- D. Mineral Wool Sound Attenuation Blankets:
 - 1. Material Quality Standard: ASTM C 665, Type I.
 - 2. Description: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of rock or slag with thermosetting resins.
 - 3. Surface Burning Characteristics: According to ASTM E 84/NFPA 255/UL 723:
 - a. Flame Spread: Class A - no greater than 25.
 - b. Smoke Developed: No greater than 50.
 - 4. Thickness: Not less than 3 in (75 mm), unless otherwise indicated.
 - 5. Density: Not less than nominal 2.5 pounds per cubic foot.
 - 6. Manufacturers:

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- a. Fibrex Insulations, Inc.
 - b. Rock Wool Manufacturing Co.
 - c. Roxul.
 - d. Thermafiber LLC.
- E. Acoustical Sealant for Non-Fire Resistance Rated Joints:
- 1. Description: Manufacturer's standard nonsag, paintable, nonstaining sealant complying with ASTM C 834 or ASTM C 920. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90 or other acceptable test method.
 - a. Preconstruction Compatibility Testing: Test sealant for compatibility with copper substrates. Testing will not be required if data submitted on previous testing of current sealant products matches those submitted.
 - b. Do not use acrylic, neoprene, and nitrile based sealants that are not recommended for use with copper substrates.
- F. Fire-Resistance Rated and Acoustical Putty Pads:
- 1. Product Quality Standard: UL 263 (ASTM E 119).
 - 2. Description: Fire-rated, non-hardening, moldable, intumescent compound formed into sheets designed to seal penetrations, construction gaps, and around electrical boxes against spread of fire, smoke, and toxic gases.
 - 3. Manufacturers and Products:
 - a. Grace Construction Products; Flamesafe FSP 1077 Putty Pads.
 - b. Hilti; CP 617 Intumescent Acoustic Putty Pads.
 - c. Hilti; CFS-P PA.
 - d. Specified Technologies, Inc; Series SSP Putty Pads.
 - e. Tremco; TREMstop Electrical Box Insert.
 - f. 3M; Fire Barrier Moldable Putty+Pads.
- G. Fire Resistive Sealants: Intumescent elastomeric sealant as specified in Division 07 Section "Fire-Resistive Joint Firestopping".
- H. Sealants: Sealant as specified in Division 07 Section "Joint Sealants".
- I. Isolation Strips: Adhesive-backed, closed cell neoprene or vinyl foam strips that allow fastener penetration with foam displacement, size as indicated, compressed 50 percent.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

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3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
1. Respective Manufacturer's written installation instructions.
 2. Accepted submittals.
 3. Contract Documents.
 4. Gypsum Association GA 216.
 5. United States Gypsum Company (USG); Gypsum Construction Handbook, if no other installation quality standard applies to condition.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Suspended Gypsum Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hanger wires at spacing required to support ceilings and that hangers will develop their full strength.

3.4 INSTALLATION OF GYPSUM BOARD ASSEMBLIES

- A. Comply with ASTM C 840.
- B. Resistance Rated Partitions: Construct fire resistance rated, smoke resistance rated, and sound resistance rated partitions according to respective assembly test reports. Ensure every material used within an assembly shall comply with manufacturers listed and product qualities indicated in respective assembly test report.
- C. Penetrations and Openings: Construct within gypsum board assemblies work as required to properly form penetration or opening to receive firestopping materials specified in following Sections:
1. Division 07 Section "Penetration Firestopping".
- D. Control Joints: Install control joints at locations indicated on Drawings, in specific locations approved by Architect for visual effect and according to the following:
1. Spaced not more than 24 to 30 feet in either direction for uninterrupted straight planes of ceilings and walls.
 2. Where different substrates occur at ceilings and walls.
 3. Where control joints occur in substrates at ceilings and walls.
 4. Where L, U, or T shaped ceiling configurations are joined.
 5. At less-than-ceiling-height cased opening frames and gypsum board openings over 60 inches in width; extend control joints from both corners at top of frame or opening up to ceiling.

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6. Where less-than-ceiling-height door frames occur on walls more than 30 feet in length; extend control joints from top of frame up to ceiling at corner of hinge side of door
 7. Where less-than-ceiling-height borrowed lites occur on walls more than 30 feet in length; extend control joints from top of frame up to ceiling and from bottom of frame to floor at both corners.
- E. Isolation from Building Structure: Isolate gypsum board assemblies from building structure to prevent transfer of loading imposed by structural movement.
1. Provide isolation joints as indicated or required by installation quality standards.
 2. Isolate ceiling assemblies abutting or penetrated by building structure.
 3. Isolate partition framing and wall furring abutting or penetrated by building structure, except at floor.
- F. Building Expansion Joints: Avoid bridging building expansion joints with metal framing or furring members; frame both sides of joints independently with framing or furring members, coordinating with building expansion joint products specified in Division 07 Section "Expansion Control".
- G. Fire-Resistance Rated and Acoustical Putty Pads: Hand apply pads to surfaces indicated, packing tightly into gaps and openings, in such a manner that pad will remain secured to surface; pinch pleat excess material together to close gaps.
- H. Supplemental Accessories: Install supplementary framing, blocking, reinforcing, and bracing in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, hand rails, furnishings, or similar construction. Comply with details indicated and recommendations of installation quality standards or manufacturer.
- 3.5 INSTALLING GYPSUM BOARD PRODUCTS
- A. General Requirements:
1. Install type of gypsum board at location indicated by gypsum board schedule at end of this Section.
 2. Do not install damaged gypsum boards.
 3. Install gypsum boards with finishable face side out.
 4. Butt gypsum boards together for a light contact at edges and ends with not more than **1/16 in (1.5 mm)** of open space between panels.
 5. Do not force gypsum boards into place.
 6. Do not place tapered edges against cut edges or ends.
 7. Locate panel joints so that no joint will align with the edge of an opening unless control joints are installed at these locations.
- B. Isolation from Building Structure:
1. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments or surfaces where movement is anticipated. Provide **1/4 in to 1/2 in (6 mm in 12 mm)** wide spaces at these locations or as indicated below:

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- a. At top of wall or where partitions intersect open building structure members projecting below underside of floor slabs and roof decks, cut to fit profile formed by coffers, joists, beams, and other structural members; form proper annular joint to receive firestopping at rated partitions and form **3/4 in (20 mm)** joint at top of wall at non-rated partitions.
 2. Trim edges with edge trim where edges of gypsum boards are exposed.
 3. Seal joints between edges and abutting structural surfaces with firestopping at rated locations and acoustical sealant at non-rated locations.
- C. Single-Layer Board Assemblies:
1. At typical conditions, install gypsum board vertically (long dimension parallel to metal framing), to minimize short end-to-short end joints unless otherwise indicated or required by assembly fire test reports.
 2. At interior of stairwells and other high walls, install gypsum boards horizontally, unless otherwise indicated or required by assembly fire test reports. Stagger abutting end joints not less than one framing member in alternate courses of gypsum boards.
- D. Multi-Layer Board Assemblies: Apply base layers and face layers vertically (long dimension parallel to metal framing) with joints of base layers located over stud or furring member and face layer joints offset at least one stud space from base layer joints, unless otherwise indicated or required by assembly fire test reports. Stagger joints on opposite sides of partitions.
- E. Typical Wall Applications:
1. Attach gypsum boards to metal studs so that leading edge or end of each board is attached to open (unsupported) edges of stud flanges first.
 2. Stagger vertical joints on opposite sides of partitions.
 3. Do not make joints other than control joints at corners of framed openings.
 4. Attach gypsum boards to framing provided at doors, openings and cutouts. Install gypsum boards over door heads and extend to not less than one stud space - **16 in (400 mm)** at each side of door or opening.
 5. Cover both faces of metal framing with gypsum boards as indicated, except in chase walls that are braced internally.
 6. Cut and fit gypsum boards around ducts, pipes, conduits, and other penetrations to form proper annular joint to receive firestopping at rated partitions.
 - a. At non-rated partitions, annual space around ducts, pipes, conduit or other penetrations to be properly sized to receive sealant; **3/4 in (20 mm)** maximum.
 - b. "Blow-out" patches are not allowed.
 7. Support both edge and end joints of gypsum boards over metal framing.
- F. Screw Attachments:
1. Attach gypsum board to metal framing with screw fasteners of type appropriate for gypsum board materials and installation conditions:
 - a. Length shall be as required by condition and penetrating metal framing not less than **3/8 in (10 mm)**.

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- b. Spacing shall be as recommended by installation quality standard, gypsum board manufacturer, or respective assembly test report.
 - c. Use properly adjusted, positive-clutch electric power tool equipped with adjustable screw-depth head and a Phillips bit. Nails and staples are not permitted.
- 2. Drive screws to slightly dimple surface without breaking face paper, fracturing core, or stripping metal framing member around screw shank.
 - 3. Space screws for non-fire resistance rated partitions and ceilings as recommended by installation quality standards.
 - 4. Space screws for fire resistance rated partitions as required by assembly fire test reports.
 - 5. Start field screwing near center and work towards edges.
 - 6. Space screws not less than **3/8 in (10 mm)** from gypsum boards edges.
 - 7. Do not attach gypsum boards to top runner where wall or partition extends to building structure unless required by fire test reports.
- G. Control Joints: Form control joints and expansion joints at locations indicated with required space between edges of adjoining gypsum boards.
- H. Sound Attenuation Blankets: Install blankets within stud cavities set so that they are held in place by friction with metal studs; ensure blankets are secure within cavity and will not become displaced when second gypsum board side is closed.
- I. Sealant:
- 1. Comply with ASTM C 919 and manufacturers written recommendations for closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
 - 2. Seal wall assemblies at perimeters, behind control joints, and at openings and penetrations with a continuous bead of sealant material according to following:
 - a. Fire Resistance Sealant: Joints within fire resistance rated assemblies.
 - b. Water Resistance Sealant: Joints within non-fire resistance rated assemblies exposed to possible water infiltration.
 - c. Acoustical Sealant: All other joints.
- 3.6 INSTALLING TRIM ACCESSORIES
- A. General: Fasten trim accessories continuously according to accessory manufacturer's instructions using gypsum board screws; installation by clinch-on tool and staples not permitted.
- B. Interior Trim Accessories: Install in the following locations:
- 1. Corner Beads: Install trim at external corners; use screws at each flange at **9 in (225 mm)** on centers, opposite each other.
 - 2. Edge Trim: Install trim where gypsum boards abut dissimilar material, and where edge of gypsum boards would otherwise be exposed; use screws at flange at **9 in (225 mm)** on centers.
 - a. LC-Bead (J-Bead): Install trim at exposed conditions where back flange can be attached to framing or supporting substrate before gypsum board installation.
 - b. L-Bead: Install trim at exposed conditions where trim can only be installed after gypsum board installation.

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- c. J-Stop: Install trim at concealed conditions where trim can only be installed after gypsum board installation.
- 3. Control Joints: Install trim at appropriate locations, ensuring gypsum board is not continuous over joint; use screws at each flange at 6 in (150 mm) on centers.
 - a. Control joints to extend 4 in (100 mm) above finished ceiling at non-rated conditions and extend to structure at rated wall conditions.
- C. Accent Trim Accessories: Install at locations indicated, mitering corners and intersections to form tight, flush and uniform joints; use screws at each flange at 9 in (225 mm) on centers.
- D. Trim Accessories at Exterior Windows: Install at locations indicated, mitering corners and intersections to form tight, flush and uniform joints; use screws at each flange at 9 in (225 mm) on centers or as recommended by manufacturer for manufactured products.

3.7 FINISHING GYPSUM BOARD PRODUCTS

- A. General: Treat board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare surfaces for decoration.
- B. Joint Tape: Finish joints according to following:
 - 1. Typical Paper-Faced Gypsum Board: Paper.
 - 2. Moisture-Resistant Paper-Faced Gypsum Board: Mesh tape.
- C. Finishing: Finish boards and units to achieve specified level of finish as indicated in schedule at end of Section:
 - 1. Typical Paper-Faced Gypsum Board: Either or combination of the following as recommended by manufacturer:
 - a. Setting-type joint compounds.
 - b. Drying-type joint compounds.
 - 2. Moisture-Resistant Paper-Faced Gypsum Board: Setting-type joint compounds.

3.8 ADJUSTMENTS

- A. Damaged Materials: Stored or installed gypsum board materials shall be classified as damaged, defective, and nonconforming Work if they have been exposed to wetness or dampness at any time prior to Substantial Completion or if they exhibit evidence of active or dormant mold or mildew. Damaged materials and assemblies shall be replaced with new and dry materials and assemblies.

3.9 PROTECTION

- A. Procedures: Protect products and systems from damage during installation and remainder of construction period according to manufacturer's instructions.

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3.10 GYPSUM BOARD SCHEDULE

- A. Gypsum Board Schedule, General: Install the designated gypsum board product based on exposure classification to water and / or moisture and applied finish system as follows, unless otherwise indicated or scheduled on the Drawings.
- B. No Exposure: Surfaces not normally exposed to water and / or moisture sources including but not limited to the following:
 - 1. Typical walls and ceilings.
 - a. Paint and Wall Coverings Only: Typical paper-faced gypsum board.
- C. Incidental Exposure: Surfaces immediately adjacent to water and / or moisture sources including, but not limited to, the following locations:
 - 1. Walls within 24 inches of centerline of drinking fountains, isolated wall-hung lavatories, and countertop sinks and other similar water sources.
 - 2. Interior face of exterior walls.
 - 3. Acceptable gypsum board products for the above listed conditions:
 - a. Paint and Wall Coverings: Moisture-resistant paper-faced or moisture-resistant paperless glass-mat gypsum board.
- D. Direct Exposure: Surfaces normally soaked, saturated, or regularly and frequently exposed to water and / or moisture including, but not limited to, the following locations:
 - 1. Walls and ceilings in toilet rooms and bathrooms including bathtubs and showers:
 - a. Tile: Moisture-resistant coated-glass-mat gypsum board.

3.11 GYPSUM BOARD FINISHING SCHEDULE

- A. Gypsum Board Finishing Schedule, General: Finish panels to Levels of Finish indicated below. Apply joint tape over panel joints, except those with trim having flanges not intended for tape. Sand between coats and after last coat to produce a surface free of defects and ready for applied finish system.
 - 1. Levels of Finish: According to ASTM C 840.
- B. Preparation: Apply joint compound at open joints, panel edges, and damaged surface areas.
- C. Level 1: At following locations, embed tape at joints in joint compound unless a higher level of finish is required for fire resistance rated assemblies. Trim accessories to be installed but not embedded in joint compound unless required for fire rating:
 - 1. Ceiling plenum areas above ceilings.
 - 2. Concealed areas.
- D. Level 2: At following locations, embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges:

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1. Substrate for tiling.
- E. Level 3: At following locations, embed tape and apply separate first and second coats of joint compound to tape, fasteners, and trim flanges:
1. Not used.
- F. Level 4: At following locations, embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges:
1. Areas to receive paint.
- G. Level 5: At following locations, embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound or Level 5 Primer and Surfacer over entire surface:
1. Not used.

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SECTION 09 3000

TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Modular tiles, membrane underlayments, setting materials, grouting materials, accessories, and supplementary items necessary for installation.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturers technical literature for each product and system indicated.
 - 1. Include manufacturers specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Include in operation and maintenance manual required by Division 01 Section Closeout Requirements. Submit manufacturers instructions for maintenance of installed work, including methods and frequency for maintaining optimum condition under anticipated use. Include precautions against cleaning materials and methods which may be detrimental to finishes and performance.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Materials: Furnish the following extra materials that match and are from same production runs as products installed, packaged with protective covering for storage and identified with labels describing contents:
 - 1. Furnish quantity of full-size tile and trim units equal to 1 percent of amount installed, for each type, composition, color, pattern, and size.

1.5 QUALITY ASSURANCE

- A. Mock-ups: Prior to fabrication and installation, build mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mock-up in the location and of the size indicated or, if not indicated, as directed by Architect. Contractor shall provide structural support framework.
 - a. Show typical components, attachments to building structure, and requirements of installation.
 - b. Build mock-ups in a layered fashion omitting tile in particular areas to reveal underlayment membranes and setting bed installation including but not limited to the following:

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- 1) Tiled wall conditions, including one interior corner.
 2. Notify Architect seven days in advance of the dates and times when mock-up will be installed.
 3. Obtain Architect's acceptance of mock-ups before starting fabrication or installation.
 4. Acceptance of mock-ups does not constitute acceptance of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically noted by Contractor and accepted by Architect in writing.
 5. Demolish and remove mock-ups when directed by Architect unless accepted to become part of the completed Work.
- 1.6 PRE-INSTALLATION CONFERENCE
- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.
- 1.7 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.
 - E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.
- 1.8 PROJECT CONDITIONS
- A. Environmental Limitations: Install tile only when construction in room is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.
- 1.9 COORDINATION
- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.
- 1.10 WARRANTY
- A. Installer's Warranty: Furnish installer's written workmanship warranty signed by an authorized representative using installer's standard form agreeing to provide labor required to repair or replace work which exhibits workmanship defects. Defects is defined to include but not limited to deterioration or failure to perform as required.
 1. Warranty Period: Installer shall warrant the installation to be free from workmanship Defects for a period of 2 years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section Substitution Procedures.
- B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
 - 1. Selections: As scheduled or as indicated in Design Selections.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.
 - 1. Tile: For each tile, obtain of same color, finish, composition, and type, from same source and production run.
 - 2. Setting and Grouting Materials: Obtain ingredients of uniform quality for each mortar and grout component from single manufacturer.

2.3 CERAMIC TILE PRODUCTS

- A. Material Quality Standard: ANSI A137.1 Specifications for Ceramic Tiling and ANSI A137.3 Specifications for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs for types, compositions, and grades of tiling indicated.
 - 1. Furnish tiling complying with Standard Grade requirements, unless otherwise indicated.
- B. Ceramic Tile, General: Thin ceramic surfacing unit made from clay, porcelain, or mixture of ceramic materials, glazed or unglazed, fired above red heat to temperature sufficient to produce specific physical properties and characteristics specified.
- C. Factory Blending: For tile exhibiting color variations, blend tile in factory and package so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
- D. Mounting: Where factory-mounted tile is used, provide back- or edge-mounted tile assemblies as standard with manufacturer. Where tile is intended for installation in wet exposure areas, do not use factory mounted tile assemblies unless tile manufacturer states that this type of mounting is suitable for installation indicated.

2.4 SETTING (MORTAR AND GROUT) MATERIALS

- A. Material Quality Standards: ANSI A118 Series as indicated.
- B. Thin-Set Latex-Portland Cement Mortar (For All Tile Types Except Glass):

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1. Material Quality Standard: ANSI A118.4 and ANSI A118.15, with the following physical properties:
 - a. Manufacturer's premium polymer modified thin-set product; gray color. Use white color with light colored stone, translucent marble or light color grout as recommended by manufacturer.
 - b. Integral antimicrobial product added during manufacturing to resist mold and mildew growth.
 - c. Non-sag capability.
 - d. Suitable for use in thin set mortar beds up to **1/4 in (6 mm)** thick.
2. Manufacturers and Products - Wall Tiling:
 - a. ARDEX Engineered Cements; X 77 Microtec.
 - b. Custom Building Products; ProLite Tile & Stone Mortar.
 - c. Laticrete International, Inc.; Laticrete Tri-Lite Large and Heavy Tile Mortar.
 - d. Mapei Corp.; Ultraflex 3 Mortar.

C. Latex-Portland Cement Grout for Tile Joints:

1. Sanded Grout:
 - a. Material Quality Standard: ANSI A118.7, with following physical properties:
 - 1) Manufacturer's premium polymer modified sanded grout product.
 - 2) Integral antimicrobial product added during manufacturing to resist mold and mildew growth.
 - b. Manufacturers and Products:
 - 1) ARDEX Engineered Cements; FL Rapid Set, Flexible, Sanded Grout.
 - 2) Custom Building Products; Prism Surecolor Grout.
 - 3) Laticrete International, Inc.; Permacolor Grout.
 - 4) Laticrete International, Inc.; Permacolor Select Grout.
 - 5) Mapei Corp.; Ultracolor Plus Grout.
 - c. Locations: Tile Joints **1/8 in (3 mm)** wide and larger.

2.5 ELASTOMERIC SEALANTS

A. Sealant Colors: Match color of adjacent grout unless otherwise indicated.

B. Mildew-Resistant Floor or Wall Joint Sealant:

1. Material Quality Standard: ASTM C 920, Type S, Grade NS, Class 25, with following physical properties:
 - a. Integral antimicrobial product added during manufacturing to resist mold and mildew growth.
 - b. Intended for sealing interior ceramic tile joints and other nonporous substrates.
 - c. Resistant to in-service exposures of high humidity and temperature extremes.

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2. Description: One-part mildew-resistant silicone sealant.
3. Manufacturers and Products:
 - a. ARDEX Engineered Cements; SX.
 - b. Custom Building Products; Commercial 100% Silicone Caulk.
 - c. Dow Corning Corp.; 786.
 - d. Laticrete International, Inc.; Latasil.
 - e. Pecora Corp.; 898.
 - f. Tremco Inc.; Tremsil 200.

C. Backer Rods:

1. Material Quality Standard: ASTM C 1330, Type B.
2. Description: Non-gassing (when punctured), bi-cellular polyethylene or polyolefin foam rod with a surface skin, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
3. Manufacturers and Products:
 - a. BASF Construction Chemicals; MasterSeal 921 (Formerly Sonneborn Soft Backer Rod).
 - b. Nomaco Inc.; Sof Rod.

- D. Backer Tape: Bond-breaking polyethylene or other plastic tape, self-adhesive where applicable, recommended by sealant manufacturer for preventing sealant from adhering to back of joint where such adhesion would result in sealant failure.

2.6 RELATED MATERIALS

- A. Cementitious Underlayments: Trowelable or self-leveling as required by conditions; pre-mixed, latex-modified, Portland cement based formulation provided by or specifically approved by setting material manufacturer; include primers if required for concrete substrate condition.
- B. Patching Compounds: Trowelable pre-mixed, latex-modified, Portland cement based formulation provided by or specifically approved by setting material manufacturer; include primers if required for concrete substrate condition.
- C. Metal Transition Strips:
 1. Schluter Systems LP; Schiene, stainless steel.
- D. Glass-Fiber Tape: Self-adhering, alkali-resistant, glass-fiber tape, 10 by 10 or 10 by 20 threads per 1 in (25 mm).; minimum 2 in (50 mm) wide.
- E. Tile Cleaner: Neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, provided by or specifically approved by tile and grout manufacturers.
- F. Grout Sealer: Manufacturers standard silicone product for sealing grout joints and that does not change color or appearance of grout.

2.7 MIXING MORTARS AND GROUT

- A. General Procedures:

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1. Mix to comply with referenced quality standards and manufacturers written instructions.
2. Add materials, water, and additives in accurate proportions.
3. Use type of mixing equipment, speeds, containers, time, and other procedures to produce uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrate surfaces to which tile will be installed for compliance with requirements, installation tolerances, and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with the Contract Documents. Starting work within a particular area will be construed as acceptance.
1. 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.
 2. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standard: In addition to standards listed elsewhere, perform tile work according to following, unless otherwise specified:
1. Respective manufacturers written installation instructions.
 2. Accepted submittals.
 3. Contract Documents.
 4. ANSI A108 installation method indicated.
 5. TCNA installation method indicated.
- B. General Requirements:
1. Extend tile into recesses and under or behind equipment and fixtures to form a complete covering without interruptions unless otherwise indicated.
 2. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 3. Accurately form intersections and returns.
 4. Perform cutting and drilling of tile without marring visible surfaces.
 5. Grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints, to form smooth edges.
 6. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile by not less than **1/8 in (3 mm)**.
- C. Jointing Pattern:
1. Unless otherwise indicated, lay tile in grid pattern.
 2. Align joints when adjoining tiles on floor, base, walls, and trim are same size.
 3. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting.

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4. Provide uniform joint widths of size recommended by tile and grout manufacturer unless otherwise indicated.
5. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.

D. Wainscots: Lay out tile to next full tile beyond dimensions indicated, and finish with bullnose shape.

3.3 PREPARATION

A. General: Comply with manufacturers instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

B. Substrate Cleaning: Remove curing compounds, coatings, laitance, efflorescence, concrete dust, dirt, oil, gypsum board dust, paint, and other residue that would adversely affect or reduce bonding.

C. Blending: Verify tile has been factory blended and packaged as specified; if not, either return to manufacturer or blend tiles at site before installing.

D. Field-Applied Temporary Protective Coating: Where needed to prevent grout from staining or adhering to exposed tile surfaces, pre-coat with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.4 TILE INSTALLATION

A. Comply with TCNAs Handbook for Ceramic 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.

B. Installation Quality Standard: Install tile according to following standards:

1. Thin-set Latex-Portland Cement Mortar: ANSI A108.5; for floor tiles **8 in by 8 in (200 mm by 200 mm)** and smaller where subfloor is not recessed; and for interior wall tiles.
2. Latex-Portland Grout: ANSI A108.10, typical unless indicated otherwise.

C. Grout Joint Widths: Install the respective types of tile with the following grout joint widths, unless otherwise recommended by tiling and grout manufacturers.

1. Paver Tile - **6 sq in (3900 mm²)** or More: **1/4 in (6 mm)**.

D. Metal Trim: Install at locations indicated and where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

E. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

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3.5 MOVEMENT JOINTS

- A. Movement Joints, General: Installation Quality Standard: In accordance with TCNA Movement Joint Design Essentials EJ171 and as specified below.
- B. Wall Joints: The following conditions shall not be grouted; install wall joint sealant and backer rod or backer tape:
 - 1. Gypsum board assembly control joints.
 - 2. Building expansion joints, unless scheduled for expansion joint cover.
 - 3. Interior corners of tiled walls, including shower and bathtub walls.
 - 4. Around substrates and tile at penetrations through tiled substrates.
 - 5. At one side of changes in direction or plane of wall.
 - 6. At joint closest and parallel to changes in substrates supporting tile between wall and floor.

3.6 CLEANING

- A. Cleaning:
 - 1. Acids are not permitted, nor will they be allowed.
 - 2. Clean tile surfaces so they are free of foreign matter.
 - 3. Remove grout residue from tile as soon as possible.
 - 4. No sooner than 10 days after installation, clean grout smears and haze from tile according to tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned.
 - 5. Protect metal surfaces and plumbing fixtures from effects of cleaning.
 - 6. Flush surfaces with clean water before and after cleaning.
 - 7. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

3.7 DEMONSTRATION

- A. Cleaning and Maintenance Training: Provide instruction to Owner's personnel for cleaning and maintenance of installed work, including methods and frequency for maintaining optimum condition under anticipated use; include precautions against cleaning materials and methods which may be detrimental to finishes and performance.

3.8 PROTECTION

- A. Coverings: When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.9 INTERIOR TILE INSTALLATION SCHEDULE

- A. Walls, Gypsum Board Substrate:
 - 1. TCNA Installation Method W243: Thin-set Latex-Portland cement mortar over coated-glass-mat gypsum board; Latex-Portland Cement Grout.

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END OF SECTION

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SECTION 09 6513

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Resilient wall base, resilient flooring accessories, and supplementary items necessary for installation.

1.2 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.
 - 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.
- B. Product Schedule: Use same designations indicated on the Finish Schedule and Drawings.
- C. Samples for Verification Purposes: In manufacturer's standard size, but not less than **12 in (300 mm)** sample of each different color and pattern of resilient product specified, showing the full range of variations expected in these characteristics.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: Class I, 0.45 W/sq. cm or greater when tested per ASTM E 648.
 - 2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

1.5 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

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 product manufacturer, but not less than **50 deg F (10 deg C)** or more than **90 deg F (32 deg C)**.

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1.7 PROJECT CONDITIONS

- A. Maintain a temperature of not less than 70 deg F (21 deg C) or more than 85 deg F (29 deg C) in spaces to receive resilient products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless otherwise recommended by product manufacturer.
- B. Maintain resilient products prior to installation at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during installation and for time period after installation recommended by manufacturer.
- D. Install resilient products after other finishing operations, including painting, have been completed.

1.8 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
 - 1. Selections: As scheduled or as indicated in Design Selections.

2.2 MATERIALS, GENERAL

- A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.3 RESILIENT MATERIALS

- A. Rubber Wall Base:
 - 1. Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset) or TP (rubber, thermoplastic), Group 1 and 2.
 - 2. Thickness: Nominal 1/8 in (3 mm).
 - 3. Lengths: Provide longest length(s) available per manufacturer. Provide coils if available in profile(s) indicated.
 - 4. Outside and Inside Corners:
 - a. Job-formed.
- B. Resilient Molding Accessories:

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1. Carpeting Accessories: Carpet cove cap, carpet step-off, carpet reducer, carpet edge bar.
2. Resilient Flooring Accessories: Reducer strip and others as required.
3. Material: Rubber.
4. Lengths: Provide longest length(s) available per manufacturer. Provide coils if available in profile(s) indicated.
5. Color and finish as selected by Architect from manufacturer's standard colors.

2.4 ACCESSORY MATERIALS

- A. Adhesives: Water-resistant type recommended by product manufacturer suitable for products, applications, and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 1. Respective manufacturer's written installation instructions.
 2. Accepted submittals.
 3. Contract Documents.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

3.4 INSTALLATION OF RESILIENT WALL BASE

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Do not stretch wall base during installation.

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- E. Masonry Wall Surfaces: On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
- F. Job-Formed Corners: Use straight pieces of maximum lengths possible.
 - 1. Outside Corners: Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 2. Inside Corners: Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.5 INSTALLATION OF RESILIENT FLOORING ACCESSORIES

- A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.6 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing resilient products:
 - 1. Remove adhesive and other surface blemishes from exposed surfaces using cleaner recommended by manufacturer.
 - 2. Sweep or vacuum horizontal surfaces thoroughly.
 - 3. Do not wash resilient products until after time period recommended by manufacturer.
 - 4. Damp-mop surfaces to remove marks and soil.
- B. Protect resilient products against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by resilient product manufacturer.

END OF SECTION

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SECTION 09 9100

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation and field painting of exposed interior items, and surfaces.
1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where indicated that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
1. Painting includes field painting of exposed bare and covered pipes and ducts, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels, unless indicated otherwise.
1. Prefinished items include the following factory-finished components:
 - a. Prefinished wood doors.
 - b. Acoustical materials.
 - c. Prefinished Architectural woodwork and cabinets.
 - d. Finished mechanical and electrical equipment.
 - e. Light fixtures.
 - f. Distribution cabinets.
 - g. Baked enamel coated items.
 - h. Fluoropolymer coated items.
 - i. Integral colored plaster.
 - j. Integral colored PVC.
 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Foundation spaces.
 - b. Furred areas.
 - c. Ceiling plenums.
 - d. Utility tunnels.
 - e. Pipe spaces.
 - f. Duct shafts.
 3. Finished metal surfaces include the following:

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- a. Anodized aluminum.
 - b. Stainless steel.
 - c. Chromium plate.
 - d. Copper and copper alloys.
 - e. Bronze and brass.
4. Operating parts include moving parts of operating equipment and the following:
- a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- a. Embossed UL labels may be used and painted where acceptable to authority having jurisdiction

D. Related Sections:

1. Division 09 Section "Gypsum Board Assemblies" for surface preparation of gypsum board assemblies.

1.2 DEFINITIONS

A. MPI Gloss Levels: MPI Gloss and Sheen Standard values are measured per ASTM D523, Method D and are as follows:

1. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees.
2. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
3. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
4. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
5. Gloss Level 5: 35 to 70 units at 60 degrees.
6. Gloss Level 6: 70 to 85 units at 60 degrees.
7. Gloss Level 7: More than 85 units at 60 degrees.

B. Interior Painting: Generally includes surfaces located in conditioned spaces.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product and system indicated.

1. Include manufacturer's specifications for materials, finishes, installation instructions, and recommendations for maintenance.

B. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

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- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated.
1. Submit Samples on rigid backing, 8 in (200 mm) square.
 2. Step coats on Samples to show each coat required for system.
 3. Label each coat of each Sample.
 4. Label each Sample for location and application area.

1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturers Project Acceptance Document: Certification that products are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that warranty will be issued.
1. Certifications by manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

1.5 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockup in the location and of the size indicated or, if not indicated, as directed by Architect.
 - a. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - 1) Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - 2) Other Items: Architect will designate items or areas required.
 - 3) Demonstrate repair procedures for damaged surfaces.
 - b. Apply samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
 - c. Final approval of color selections will be based on benchmark samples.
 - 1) If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

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2. Notify Architect seven days in advance of the dates and times when mock-up will be installed.
3. Obtain Architect's acceptance of mock-ups before starting fabrication or installation.
4. Acceptance of mock-ups does not constitute acceptance of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically noted by Contractor and accepted by Architect in writing.
5. Demolish and remove mock-ups when directed by Architect unless accepted to become part of the completed Work.

1.6 PRE-INSTALLATION CONFERENCE

- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.8 PROJECT CONDITIONS

- A. Apply paints only when temperatures of surfaces to be painted and surrounding air are between minimum and maximum range recommended by manufacturer.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.9 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
 1. Behr.
 2. Benjamin Moore & Co.
 3. Dunn-Edwards Corporation.
 4. Kelly-Moore Paints.
 5. PPG Paints.
 6. Pratt & Lambert Paints.
 7. Sherwin-Williams Company (The).

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- B. Color and Gloss: As scheduled or as indicated in Design Selections.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Source Limitations: Obtain block fillers and field applied primers for each coating system from the same manufacturer as the finish coats.
- C. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to shop applicators to ensure use of compatible primers.

3.2 INSTALLATION

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform work according to the following, unless otherwise specified in this Section:
 - 1. Respective manufacturer's written installation instructions.
 - 2. Approved submittals.
 - 3. Contract Documents.
 - 4. MPI Architectural Painting Specification Manual" or "MPI Maintenance Repainting Manual", as applicable.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations and specifications for cleaning and surface preparation. Surfaces shall have no defects or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

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- B. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" applicable to substrates and paint systems indicated.
- C. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates, unless expressly permitted by authorities having jurisdiction for labels intended to be painted.
- D. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- E. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
 - 1. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
 - 1. Galvanized metal substrates shall not be chromate passivated. If galvanized metal is chromate passivated, provide surface preparation and primers recommended by manufacturer.
- G. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.4 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items, equipment, and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items, equipment, or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 - 5. The number of coats and film thickness required are the same regardless of application method.
 - 6. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

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7. Omit primer over metal surfaces that have been shop primed and touchup painted.
8. Allow sufficient time between successive coats to permit proper drying.

- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat. Tint per manufacturer's technical data for each type of primer or undercoat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve total dry film thickness of the entire system as recommended by manufacturer.

3.5 MECHANICAL AND ELECTRICAL WORK PAINTING AND IDENTIFICATION

- A. Painting of Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work to be done when exposed in the following locations:
 1. Occupied Spaces.
- B. Equipment includes, but is not limited to, the following:
 1. Tanks that do not have factory-applied final finishes.
 2. Equipment that is indicated to have a factory-primed finish for field painting.
- C. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces. Paint with a flat, nonspecular black paint.

3.6 FIRE AND SMOKE BARRIER IDENTIFICATION

- A. Fire and smoke resistant rated walls shall be effectively and permanently identified with signs, labels or stencils in a manner acceptable to authority having jurisdiction.
 1. Identification shall be above decorative ceiling and in concealed spaces, on each segment of the wall and 6'-0" O.C. maximum on each side of wall.

3.7 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 2. Testing agency will perform tests for compliance of paint materials with product requirements.

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3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.8 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
- E. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces to match approved samples.

3.9 INTERIOR PAINTING SCHEDULE

- A. Steel Substrates:
 1. Institutional Low-Odor/VOC Latex System: MPI INT 5.1S.
 - a. Prime Coat: Rust-inhibitive primer (water based), MPI #107.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.
 - d. Topcoat: Latex, interior, institutional low odor/VOC, gloss (MPI Gloss Level 6), MPI #148.
 - e. Gloss and Sheen: As scheduled or as indicated in Design Selections.
- B. Gypsum Board and Plaster (Gypsum and Portland Cement) Substrates:
 1. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M.
 - a. Prime Coat: Institutional low-odor/VOC primer/sealer, MPI 149.
 - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
 - c. Topcoat: Latex, interior, institutional low odor/VOC, flat (MPI Gloss Level 1), MPI #143.
 - d. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 2), MPI #144.
 - e. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 3), MPI #145.
 - f. Topcoat: Latex, interior, institutional low odor/VOC (MPI Gloss Level 4), MPI #146.
 - g. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.

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- h. Topcoat: Latex, interior, institutional low odor/VOC, gloss (MPI Gloss Level 6), MPI #148.
 - i. Gloss and Sheen: As scheduled or as indicated in Design Selections.
2. Water-Based Epoxy Coating System: MPI INT 9.2F.
- a. Prime Coat: Interior latex primer/sealer, MPI #50.
 - b. Intermediate Coat: Epoxy-Modified Latex, Interior, matching topcoat.
 - c. Topcoat: Epoxy-Modified Latex, Interior, semi-gloss (MPI Gloss Level 5), MPI #215.
 - d. Topcoat: Epoxy-Modified Latex, Interior, gloss (MPI Gloss Level 6), MPI #115.
 - e. Gloss and Sheen: As scheduled or as indicated in Design Selections.

END OF SECTION

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SECTION 11 7000

MEDICAL EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Work of this Section includes related wall support, mechanical and electrical connections for medical equipment provided by Owner.
- B. Medical equipment information at the end of this Section is for reference only.

1.2 ACTION SUBMITTALS

- A. Product Data: Furnished by Owner.
- B. Shop Drawings: Contractor shall furnish shop drawings of equipment installation when necessary to ensure coordination of the Work.

PART 2 - PRODUCTS

2.1 OWNER FURNISHED / OWNER INSTALLED EQUIPMENT

- A. Products: Identified as "OFOI". Product is provided by Owner and installed by Owner.
- B. Contractor Responsibilities: Limited to interface, surface preparations and utilities indicated on the Drawings or specified in the Specifications.

2.2 OWNER FURNISHED / CONTRACTOR INSTALLED EQUIPMENT

- A. Products: Identified as "OFCI". Product is provided by Owner and installed by the Contractor.
- B. Contractor Responsibilities: Provide labor, transportation, materials, tools, appliances and utilities necessary for the following:
 - 1. Transportation of product from Owner's facility to the job site.
 - 2. Receiving and storage of product.
 - 3. Installation of product, complete and in operating condition, including adjusting and calibration of product as necessary for proper operation.
 - 4. Testing of product.
 - 5. Paying of fees, licenses, and taxes in conjunction with installation of the product.
 - 6. Roughing-in and final utility connections for product remain the work of specification sections governing the specific utility.

2.3 CONTRACTOR FURNISHED / CONTRACTOR INSTALLED EQUIPMENT

- A. Products: Identified as "CFCI". Product is provided by Contractor and installed by Contractor.

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- B. Contractor Responsibilities: Furnish equipment and installation as indicated in other specification sections.

2.4 OWNER FURNISHED / VENDOR INSTALLED EQUIPMENT

- A. Products: Identified as "OFVI". Product provided by Owner, and installed by Owner's vendor.
- B. Contractor Responsibilities: Limited to interface, surface preparations and utilities indicated on the Drawings or specified in the Specifications.

2.5 FUTURE EQUIPMENT

- A. Products: Identified as "Future". Product provided by Owner and installed by others in the future.
- B. Contractor Responsibilities: Limited to interface, surface preparations and utilities indicated on the Drawings or specified in the Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. For Contractor installed medical equipment, examine substrate surfaces to receive medical equipment and associated work and conditions under which work will be installed. Do not proceed until unsatisfactory conditions have been corrected in a manner acceptable to the Installer. Starting of work within a particular area will be construed as installer's acceptance of surface conditions.

3.2 PREPARATION

- A. Coordinate work of this Section with related work of other Sections to obtain proper installation of items. Become acquainted with the work of other Sections whose work abut, adjoin or are in any way affected by or related to work under this Section.
- B. Carefully examine the drawings and directions and be responsible for proper installation of materials and product without substantial changes.
- C. Indication of pipe connection sizes on the plans shall in no way relieve Contractor of the responsibility of checking and verifying their sizes and locations from the actual product to be installed and any available roughing-in diagrams.

3.3 SCOPE OF WORK

- A. Back-up Support: Provide wall reinforcing, backing and bracing for wall mounted equipment.
- B. Concrete: Provide work indicated or required including, but not limited to, the following:
 - 1. Housekeeping pads.
 - 2. Trenches.
 - 3. Anchor bolts.
 - 4. Vibration isolation devices.

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- 5. Core drilling.
- 6. Sleeves.

- C. Heating, Ventilating, and Air Conditioning (HVAC): Provide work indicated or required including, but not limited to, exhaust ducts from connection point of equipment to building exhaust system.

- D. Plumbing: Provide work indicated or required, including, but not limited to, the following:
 - 1. Devices such as vacuum breakers, pressure reducing valves, shut-off valves, trim, traps, filters, etc.
 - 2. Water, waste, gas, air, and steam connections to equipment.

- E. Electrical: Provide work indicated or required including, but not limited to, the following:
 - 1. Wiring and devices.
 - 2. Power and lighting service.
 - 3. Connections to equipment.

- 3.4 SCHEDULE OF MEDICAL EQUIPMENT
 - A. Refer to separately bound document.

END OF SECTION

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SECTION 13 4900

RADIATION PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Work required for this section includes radiation protection and supplementary items necessary to complete its installation.

1.2 DEFINITIONS

- A. Lead Equivalence: The thickness of lead that provides the same attenuation (reduction of radiation passing through) as the material in question under the specified conditions.

- 1. Lead equivalence specified for materials used in diagnostic x-ray rooms is as measured at 100 kV unless otherwise indicated.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product and system indicated.

- 1. Include manufacturer's specifications for materials, finishes, construction details, installation instructions, and recommendations for maintenance.

- B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components and attachments to other work. Distinguish between shop and field-assembled work

- 1. Show layout of radiation-protected areas. Indicate lead thickness or lead equivalence of components. Show components and installation conditions not fully dimensioned or detailed in product data.
 - 2. Show ducts, pipes, conduit, and other objects that penetrate radiation protection; include details of penetrations.

1.4 INFORMATIONAL SUBMITTALS

- A. Field Quality Control Reports: Written report of testing and inspection required by "Field Quality Control".

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:

- 1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.
 - 2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.

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3. Manufacturer Acceptance: Installer shall be certified, approved, licensed, or acceptable to manufacturer to install products.
 - B. Fire-Rated and Smoke-Control Door and Frame Assemblies: Comply with Division 08 Section "Hollow Metal Doors and Frames" and Division 08 Section "Prefinished Flush Wood Doors".
 - C. Glazing: Comply with requirements in Division 08 Section "Glazing."
- 1.6 PRE-INSTALLATION CONFERENCE
- A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.
 1. Participants:
 - a. Architect.
 - b. Contractor, including superintendent.
 - c. Installer, including project manager and supervisor.
 - d. If requested, Manufacturer's qualified technical representative.
 - e. Installers of other construction interfaced with Work.
 2. Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited to, following topics:
 - a. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
 - b. Review Contract Document requirements.
 - c. Review approved submittals.
 - d. Review inspection and testing requirements.
 - e. Review environmental conditions and procedures for coping with unfavorable conditions.
 - f. Resolve deviations or differences between Contract Documents and the manufacturer's specifications.
 - g. Sequence and schedule of radiation protection work in relation to other work.
 - h. Supplementary lead shielding at duct, pipe, and conduit penetrations of radiation protection.
 - i. Methods of attaching other construction and equipment to lead-lined finishes.
 - j. Notification procedures for work that requires modifying radiation protection
 - B. Record discussions, including decisions and agreements, and prepare report.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Lead-Lined Gypsum Panels: Neatly stack panels flat to prevent deformation.
 - B. Lead-Lined Steel Frames: Comply with requirements in Division 08 Section "Hollow Metal Doors and Frames" for delivery, storage, and handling.
 - C. Lead-Lined Wood Doors: Comply with requirements in Division 08 Section "Prefinished Flush Wood Doors" for delivery, storage, and handling.

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1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install radiation protection until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".

- 1. A & L Shielding Inc.
- 2. NELCO, Inc.
- 3. Radiation Protection Products, Inc.
- 4. Ray-Bar Engineering Corp.

- B. Lead Glass Manufacturers Only:

- 1. Amerope Enterprises, Inc.
- 2. McGrory Glass, Inc.
- 3. Schott North America, Inc.

2.2 MATERIALS, GENERAL

- A. Source Limitations: Obtain each type of radiation protection product from single source from single manufacturer unless otherwise indicated.

2.3 PERFORMANCE REQUIREMENTS

- A. Provide materials and workmanship, including joints and fasteners, that maintain continuity of radiation protection at all points and in all directions equivalent to materials specified in thicknesses and locations indicated.

- 1. Materials, thicknesses, and configurations indicated are based on radiation protection design prepared by Owner's radiation health physicist. Refer to Appendix at the end of this Section for availability of report.

- a. Thicknesses:

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- 1) Lead Sheet Thickness: Refer to Owner-provided radiation health physicist report.
- B. Lead-Lined Assemblies: Unless otherwise indicated, provide lead thickness in doors, door frames, window frames, penetration shielding, joint strips, film transfer cabinets, and other items located in lead-lined assemblies not less than that indicated for assemblies in which they are installed.
- C. Lead Glazing: Unless otherwise indicated, provide lead equivalence not less than that indicated for assembly in which glazing is installed.

2.4 MATERIALS

- A. Lead Sheet, Strip, and Plate: ASTM B 749, alloy UNS No. L51121 (chemical-copper lead).
- B. Lead-Lined Gypsum Board: **5/8 in (15 mm)** thick gypsum board complying with Division 09 Section "Gypsum Board Assemblies," of width and length required for support spacing and to prevent cracking during handling, and with a single sheet of lead laminated to the back of the board.
1. Provide lead sheet lining the full width and length of board unless Owner's radiation health physicist report indicates coverage to only extend from floor to **84 in (2100 mm)** above floor.
 2. Provide **3 in (75 mm)** wide lead strips for wrapping metal stud flanges.
 3. Provide **2 in (50 mm)** wide lead strips for backing joints.
 4. Provide **5/16 in (8 mm)** lead disks for covering screw heads.
 5. Provide lead-headed nails for fastening gypsum board, accessories, and trim to wood members.
- C. Lead Glass: Lead-barium, polished float glass containing not less than 60 percent heavy metal oxides, including not less than 48 percent lead oxide by weight.
1. Safety Glass: Where indicate or where required, provide fully tempered or laminated float glass.
 - a. Outer Lite: Clear float glass.
 - b. Interlayer: Clear polyvinyl butyral (PVB) or cured resin of manufacturer's standard thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 - c. Inner Lite: Lead-barium, polished float glass as specified above.
- D. Accessories and Fasteners: Provide manufacturer's standard fasteners and accessories as required for installation, maintaining same lead equivalence as rest of system.

2.5 LEAD-LINED WOOD DOORS

- A. Comply with requirements of Division 08 Section "Prefinished Flush Wood Doors".

2.6 LEAD-LINED STEEL HOLLOW-METAL DOOR FRAMES

- A. Comply with requirements of Division 08 Section "Hollow Metal Doors and Frames".

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2.7 INFORMATIONAL SIGNS

- A. Informational Signs, General: Fabricate signs by engraving lettering in high-pressure-laminate engraving stock with contrasting face and core. Machine-engrave copy using high-speed cutters mechanically positioned by master templates for accurately formed letters, numbers, and symbols.
1. Color: As selected by Architect from manufacturer's full range of colors.
 2. Provide copy indicated or as directed. Provide signs of sufficient size to contain required information.
 3. Indicate lead equivalence in millimeters and heights of radiation protection in **in** (millimeters).
- B. Rooms Where the Level of Protection Is Uniform Throughout: Provide one sign for each room indicating lead equivalence of partitions, ceilings, floors, doors, and other portions of radiation protection enclosure. Indicate height of radiation protection above floor or indicate that partitions are radiation protected to full height.
- C. Rooms Where the Level of Protection Is Not Uniform Throughout: Provide one sign for each room with different lead equivalences in different locations. Indicate, in tabular form, lead equivalence of each wall, partition, ceiling, floor, door, and window. Indicate height of radiation protection above floor or indicate that partitions are radiation protected to full height. Indicate where lead equivalence changes or is not continuous.
- D. Rooms Where Some Partitions Are without Radiation Protection: Provide one sign for each partition that contains radiation protection and indicate its lead equivalence. Indicate height of radiation protection above floor or indicate that partitions are radiation protected to full height.
- E. Rooms Where Only the Door Has Radiation Protection: Provide one sign for each door indicating its lead equivalence.

2.8 DOOR AND DOOR FRAME FABRICATION

- A. Hardware Preparation: Factory prepare doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

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3.2 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. Respective manufacturer written installation instructions.
 - 2. Accepted submittals.
 - 3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3.3 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

3.4 INSTALLATION OF LEAD-LINED GYPSUM BOARD

- A. Install with long edge parallel to supports and lead lining facing supports. Provide blocking at end joints.
- B. Fastening to Metal Supports: Use steel drill screws spaced as recommended in writing by gypsum board manufacturer. Install lead strips covering face of framing and wrap around flange to cover points of screws.
 - 1. Where possible, install lead-lined gypsum board before installing gypsum board on other side of partition, and do not fold lead strips back over inside of flange until after lead-lined gypsum board is applied.
 - 2. Apply lead disks recessed flush with surface of board over heads of screws securing trim.
- C. Two-Layer System: Apply a facing sheet of gypsum board vertically over base sheet using laminating adhesive recommended in writing by gypsum board manufacturer. Offset joints in finish layer from joints in base layer and fasten at top and bottom of sheet to support finish panel until adhesive has set.
 - 1. Locate fasteners above ceiling or behind wall base and cover fasteners with lead disks recessed flush with surface of board.
- D. Openings: Extend lead-lined gypsum board into frames of openings, lapping lead lining with lead frames or frame linings at least 1 in (25 mm). Arrange board around openings so neither horizontal nor vertical joints occur at corners of openings.
- E. Install control and expansion joints where indicated, with appropriate trim accessories. Install lead strip on face of framing, extending across joint, and lap with lead lining of gypsum board.

3.5 INSTALLATION OF LEAD-LINED DOOR AND DOOR FRAMES

- A. Door Frames: Install lead-lined steel frames according to Division 08 Section "Hollow Metal Doors and Frames," unless otherwise indicated.

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- B. Flush Wood Doors: Install lead-lined wood doors according to Division 08 Section "Prefinished Flush Wood Doors."
- C. Lap lead lining of frames over lining in walls at least **1 in (25 mm)**.
- D. Line astragals with lead sheet.
- E. Hardware: Line covers, escutcheons, and plates to provide effective shielding at cutouts and penetrations of frames and doors. See Division 08 Section "Door Hardware" for other installation requirements.

3.6 INSTALLATION OF LEAD-LINED OBSERVATION WINDOWS

- A. Install observation windows according to manufacturer's written installation instructions.
- B. Install windows level, plumb, square, true to line, and anchored securely in place to structural support.
- C. Install leaded side of frame on radiation side of wall. Lap lead lining of frames over lining in walls at least **1 in (25 mm)**.
- D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with manufacturer's written instructions.

3.7 INSTALLATION OF PENETRATING ITEMS

- A. At penetrations of lead linings, provide lead shields to maintain continuity of protection.
- B. Provide lead linings, sleeves, shields, and other protection in thickness not less than that required in assembly being penetrated.
- C. Secure shields at penetrations using adhesive or wire ties but not penetrating fasteners unless indicated on Drawings.
- D. Outlet Boxes and Conduit: Cover or line with lead sheet lapped over adjacent lead lining at least **1 in (25 mm)**. Wrap conduit with lead sheet for a distance of not less than **10 in (250 mm)** from box.
- E. Duct Openings: Unless otherwise indicated, line or wrap ducts with lead sheet for distance from partition/ceiling equal to three times the largest opening dimension. Lap lead sheet with adjacent lead lining at least **1 in (25 mm)**.
- F. Piping: Unless otherwise indicated, wrap piping with lead sheet for a distance of not less than **10 in (250 mm)** from point of penetration.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections after radiology equipment has been installed and placed in operating condition.
- B. Correct deficiencies in or remove and replace radiation protection that inspection reports indicate does not comply with specified requirements.

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3.9 PROTECTION

- A. Lock radiation-protected rooms once doors and locks are installed and limit access to only those persons performing work in the rooms.

3.10 APPENDIX

- A. Owner's Radiation Health Physicist Report: Available to Contractor on request.

END OF SECTION