CONSTRUCTION DOCUMENTS
PROJECT MANUAL

Pawtucket School Department
Goff Middle School
Emergency Fire Code Upgrades

December 6, 2024

BTGA No. 2144

SECTION 00 0110

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SECTION 01 1000
SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Access to site.
3. Coordination with occupants.
4. Work restrictions.
5. Owner-Furnished Products.
6. Specification and Drawing conventions.
7. Contractors Duties.
8. Health and Safety Precautions.
9. Miscellaneous provisions.

B. Related Requirements:

1. Section 01 5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Name: Goff Middle School & Tolman High School

B. Architect: Brewster Thornton Group Architect

C. Owner: Pawtucket School Department

D. Owner’s Project Manager: Colliers Project Leaders

E. The Project consists of the construction indicated on the contract documents including but not limited to:

1. All work is as indicated on the drawings.

1.4 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price, AIA A101 and A201 as included with the project RFP/Section 00 1000.

1.5 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 4100.

B. Scope of alterations work is indicated on drawings.

C. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.

D. Data and IT: Alter existing system and add new construction. Interface with Owner to maintain existing systems.

E. Contractor to provide the services of: National Security: contact: Chris Morra for rewiring of security systems.

F. Fire Suppression Sprinklers: Alter existing system and add new construction, keeping existing in operation.

1.6 WORK BY OWNER

A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Date of Substantial Completion. Some items include:

1. Desktop Computers

B. Owner will supply and install the following:

1. N/A

C. Owner will supply the following for installation by Contractor:

1. Soap dispenser, paper towel dispenser, hand sanitizer dispenser.

1.7 FUTURE WORK

A. Future work to include the installation of a future wheelchair lift at the Gymnasium egress stair by others.

1.8 OWNER OCCUPANCY

A. Owner intends to continue to limited occupy of adjacent portions of the existing building during the entire construction period.

B. Owner intends to occupy the Project upon Substantial Completion.

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

1.9 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Arrange use of site and premises to allow:

1. Limited Owner occupancy.

C. Provide access to and from site as required by law and by Owner:

1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.

2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Utility Outages and Shutdown:

1. Limit disruption of utility services to hours the building is unoccupied.

2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.

3. Prevent accidental disruption of utility services to other facilities.

1.10 WORK SEQUENCE

A. Construction is to be completed onsite in a single phase without periods of inactivity. Contractor is required to determine the lead time of all required products and provide submittals for approval in a timely manner.

B. Contractor to begin work as soon as the contract has been completed. Work onsite to begin the last Monday in June 27th and must be complete by August 24th.

C. Furniture placement: In the event the proposed furnishings are not received in time for the opening of school. The district intends to continue to use the existing furnishings until the proposed furniture arrives. Contractor to install furniture when it arrives even if this is after Owner occupancy.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 2500

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
2. Divisions 02 through 26 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

B. 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.

C. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

B. Substitution Request Form: Use CSI Form 13.1A and/or facsimile of form.

C. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

1. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

2. 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.
3. 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.
4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
5. Samples, where applicable or requested.
6. Certificates and qualification data, where applicable or requested.
7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
8. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
9. Research reports evidencing compliance with building code in effect for Project, from ICC-ES. 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.
10. Cost information, including a proposal of change, if any, in the Contract Sum.
11. 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.
12. 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.

D. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 7 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

1. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
2. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

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

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

B. 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:

1. Requested substitution is consistent with the Contract Documents and will produce indicated results.
2. Requested substitution provides sustainable design characteristics that specified product provided for achieving NE-CHPS prerequisites and credits.
3. Substitution request is fully documented and properly submitted.
4. Requested substitution will not adversely affect Contractor's construction schedule.
5. Requested substitution has received necessary approvals of authorities having jurisdiction.
6. Requested substitution is compatible with other portions of the Work.
7. Requested substitution has been coordinated with other portions of the Work.
8. Requested substitution provides specified warranty.
9. Requested substitution is equal or superior to the specified product in terms of aesthetics.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

C. Substitutions for Convenience: Generally not allowed unless otherwise indicated.

D. The contractor making the substitution is responsible for all costs associated with the substitution, including costs to other contractors, and design team costs necessary to accommodate the substituted product.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 0 12500

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. Related Requirements:

1. Section 01 2500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions (ASI) authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time. Contractor will notify the Owner and Architect within 7 calendar days of receipt of an ASI, or before starting work (whichever is sooner) of any cost implications. Failure to make such notification will indicate the Contractor's agreement that the directed work is a no cost change.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the Owner.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 2500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, the General Contractor will issue a Change Order for signatures of Owner, Owner’s Project Manager, Architect, and Contractor.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for possible 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, if applicable.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. Present time and material records to the Owner's on-site representative daily for review and certification. Time and material records not certified by the Owner's representative the same day as the work will not be considered as part of the change in Contract Sum or Time.

2. After completion of change and certification of records, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 01 2900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 01 3100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 01 3200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 01 4000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 01 7700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 01 7823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Section 01 7839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
8. Section 01 7900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Construction Manager.
5. Name of Contractor.
6. Name of firm or entity that prepared submittal.
7. Names of subcontractor, manufacturer, and supplier.
8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
9. Category and type of submittal.
10. Submittal purpose and description.
11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
12. Drawing number and detail references, as appropriate.
13. Indication of full or partial submittal.
14. Location(s) where product is to be installed, as appropriate.

15. Other necessary identification.
16. Remarks.
17. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

E. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Prepare submittals as PDF package, and transmit to Architect by sending electronically. Include PDF transmittal form.

a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.

b. Typical Submittal Process:

All documentation (Product data, test reports, qualifications, Color charts, NE-CHPS, delegated design, etc.) Missing information will result in the entire submission being considered incomplete and will be returned without review.

2. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.

B. Samples: Samples may be hand delivered at the job site or directly shipped to the Architect's office. Photographs of the samples should be provided with the transmittal where annotation of the submittal and approval will be recorded.

C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections 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.

D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 business days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 10 business days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 business days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 10 business days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

    a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

E. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

G. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

H. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action take as follows:
1. Final Unrestricted Release: The Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
    a. Marking: “Approved for Design.”
2. Final-But-Restricted Release: The Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
    a. Marking: “Approved For Design as Noted.”

3. Returned for Resubmittal: DO no proceed with Work covered by the submittal, including purchasing, fabrication, deliver, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
   a. Marking: “Rejected-Resubmit”
   b. Do not use, or allow others to use, submittals marked “Rejected, Resubmit” at the Project Site or elsewhere where Work is in process.
4. Non-Complying Submittals: Submittals which do not comply with the Contract Documents shall not be submitted. Should a submittal which does not comply with the Contract Documents be forwarded, said submittal will be returned without action.
5. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal.
   a. Marking: “Action Not Required.”

1.7 SUBMITTAL REQUIREMENTS

A. 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 unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

   a. Wiring diagrams that show 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 Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.

d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
4. Paper Transmittal: Include paper transmittal including complete submittal information indicated with each sample submission.
5. 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.

6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

b. Every sample must be labeled with product and finish information. Owner and Architect are not responsible for any issues arising from improperly labeled samples.

7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. 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.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
2. 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.
3. 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.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. 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.

H. Test and Research Reports:

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

I. NE-CHPS Submittals: Comply with requirements specified in Division 01 Sustainable design requirements section.

1.8 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and two 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.

2. Responsible design professional shall be someone licensed to perform the type of engineering required.

3. Responsible deign professional shall submit a stamped and signed construction control affidavit as part of the delegated design submission.

4. The registered delegated design engineer is to make periodic visits to the site to inspect and test as necessary items designed by them. Field reports shall be generated for all site visits. Those field reports shall be promptly submitted to the DOR for review and record.

5. After completion of the work and based on these inspections, an affidavit stamped with the seal of the engineer is to be issued to the DOR and SER. The affidavit shall state that all the work has been installed in accordance with their design.

C. BIM Incorporation: Incorporate delegated-design drawing and data files into BIM established for Project.

1. Prepare delegated-design drawings in the following format: Same digital data software program, version, and operating system as original Drawings.

1.9 CONTRACTOR'S REVIEW

A. Action Submittals 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. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include 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.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.

1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

2. Submittals by Web-Based Project Software: Architect will indicate, on Project software website, the appropriate action.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will return without review submittals received from sources other than Contractor.

F. Architect time for review shall be 14 calendar days for initial submissions and 14 calendar days for each revision.

G. If more than 5 submissions for any specification division are received within 48 hours then the architect's review time is extended by 1 day per review received.

H. Architect will make 1 initial and 2 revision reviews. Reviews beyond 3 for any submission will be back-charged to the contractor at the rate of $500 per review.

I. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 3566.05

PROJECT SUSTAINABILITY CREDIT SUMMARY

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. Project Name: Goff Middle School.

B. City: Pawtucket.

C. State: Rhode Island.

1.2 PROJECT GOALS

A. This project will follow the NE-CHPS Certified system's requirements for Renovations.

1. The credits listed below are all requirements for Renovations. There is no point total requirement for this project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CREDIT SUMMARY

A. INTEGRATION
1. II 1.0 Integrated Design.
    a. Conduct a minimum of two integrated design team workshops that identify the project's high-performance goals, ensure the incorporation of all CHPS prerequisites, and target the appropriate CHPS credits and best practices as an ongoing part of programming and design decision making.
        1) For renovations, the first workshop must take place during the planning phase. The second workshop must occur prior to the beginning of the construction documentation phase.
    b. Each workshop must include representatives from Owner, Design Consultants, Construction Group, School Occupant Representatives

3.2 OPERATIONS AND MAINTENANCE

A. OM 1.0 Faculty Staff & Occupant Training.

1. Faculty & Staff: Facility staff must receive training and operation & maintenance (O&M) documentation on all building systems included in the commissioning scope of work including systems related to high performance – lighting and maintenance of finishes.
   2 Teacher and Administrative: Teachers, administrators, and support staff must be provided with training on operations of lighting, heating, and cooling systems in classrooms.

3.3 INDOOR ENVIRONMENTAL QUALITY

A. EQ 7.0 Low Emitting Materials.

1. Paints and Coatings 90%, or more, of the total volumes of such products shall meet the applicable VOC content requirements of 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 June 3, 2011..
2. Flooring Systems 75%, or more, of the installed area of such products shall be shall be tested for emissions of VOCs of concern with respect to chronic inhalation exposures following the specifications of the CDPH Standard Method V1.1, 2010.
3. Composite Wood 90 percent, or more, of the total area of composite wood panels and the composite wood cores of finished building products (e.g., engineered wood floors, doors, trim/molding, cabinetry, and counter tops) shall meet the applicable ATCM Phase 2 formaldehyde emission standards

3.4 MATERIALS AND WASTE MANAGEMENT

A. MW1.0 – Storage and Collection of recyclables

1. All doors removed will be returned to school facilities for re-use.

B. MW2.0 – Minimum Construction Waste Management

1. Recycle, reuse, and/or salvage at least 75% (by weight) of nonhazardous construction and demolition waste, not including land clearing and associated debris. All doors to be salvaged and returned to the school.

3.5 JOINT USE OF FACILITIES

A. SS8.1 – Controlled access to community.

1. Provide direct access to “Joint-Use Area” owned and/or operated by a non-school entity. The ”Joint-Use Area” must be accessed and secured independently of the non- joint-use portions of the facility (1 point).
2. Provide an entrance for spaces identified for Joint-Use so that nonschool hours' access can be segregated the non-public parts of the school facilities and grounds. The ”Joint-Use Area” must be accessed and secured independently from the non-Joint-Use portions of the site.
3. Share at least 50% of parking space required, based on total availability, with the community, and make those spaces available outside school hours.

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

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

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described 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.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. 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, assembly, 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).

D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and 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. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.

E. 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.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. 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.

J. 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. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.4 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
2. Refer to additional requirements in Section 01 3300 – Submittal Procedures.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups.

1. Include plans, sections, and elevations, indicating materials and size of mockup construction.
2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: 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.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager shall not have other Project responsibilities.

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. Distinguish source quality-control tests and inspections from field quality-control 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 Commissioning Authority.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 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, telephone number, and email address 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 inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
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, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. 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, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.10 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329 and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

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 and test assemblies, and; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority, 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. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect
3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.

a. Allow seven days for initial review and each re-review of each mockup.

7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
8. Demolish and remove mockups when directed unless otherwise indicated.

L. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.

1.11 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.

3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. 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.

D. Testing Agency Responsibilities: Cooperate with Architect , Commissioning Authority, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Commissioning Authority, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. 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.

G. Associated Contractor Services: Cooperate with agencies and representatives 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 inspection. 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 inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect, Commissioning Authority, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority, with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections a Substantial Completion, which includes a list of unresolved deficiencies.

5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect, Commissioning Authority, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority, with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

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

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

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

3.2 REPAIR AND PROTECTION

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

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

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

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

END OF SECTION

SECTION 01 4200

REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

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

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Abbreviations and acronyms not included in this list shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).

27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/.
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - CSA Group; www.csagroup.com.
65. CSA - CSA International; www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.
67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).

76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. ICBO - International Conference of Building Officials; (See ICC).
101. ICC - International Code Council; www.iccsafe.org.
102. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
103. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
104. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
105. IEC - International Electrotechnical Commission; www.iec.ch.
106. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
107. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
108. IESNA - Illuminating Engineering Society of North America; (See IES).
109. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
110. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
111. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
112. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
113. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
114. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
115. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
116. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
117. ISO - International Organization for Standardization; www.iso.org.
118. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
119. ITU - International Telecommunication Union; www.itu.int/home.
120. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
121. LMA - Laminating Materials Association; (See CPA).
122. LPI - Lightning Protection Institute; www.lightning.org.
123. MBMA - Metal Building Manufacturers Association; www.mbma.com.

124. MCA - Metal Construction Association; www.metalconstruction.org.
125. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
126. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
127. MHIA - Material Handling Industry of America; www.mhia.org.
128. MIA - Marble Institute of America; www.marble-institute.com.
129. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
130. MPI - Master Painters Institute; www.paintinfo.com.
131. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
132. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
133. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
134. NADCA - National Air Duct Cleaners Association; www.nadca.com.
135. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
136. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
137. NBI - New Buildings Institute; www.newbuildings.org.
138. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
139. NCMA - National Concrete Masonry Association; www.ncma.org.
140. NEBB - National Environmental Balancing Bureau; www.nebb.org.
141. NECA - National Electrical Contractors Association; www.necanet.org.
142. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
143. NEMA - National Electrical Manufacturers Association; www.nema.org.
144. NETA - InterNational Electrical Testing Association; www.netaworld.org.
145. NFHS - National Federation of State High School Associations; www.nfhs.org.
146. NFPA - National Fire Protection Association; www.nfpa.org.
147. NFPA - NFPA International; (See NFPA).
148. NFRC - National Fenestration Rating Council; www.nfrc.org.
149. NHLA - National Hardwood Lumber Association; www.nhla.com.
150. NLGA - National Lumber Grades Authority; www.nlga.org.
151. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
152. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
153. NRCA - National Roofing Contractors Association; www.nrca.net.
154. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
155. NSF - NSF International; www.nsf.org.
156. NSPE - National Society of Professional Engineers; www.nspe.org.
157. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
158. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
159. NWFA - National Wood Flooring Association; www.nwfa.org.
160. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
161. PDI - Plumbing & Drainage Institute; www.pdionline.org.
162. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
163. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
164. RFCI - Resilient Floor Covering Institute; www.rfci.com.
165. RIS - Redwood Inspection Service; www.redwoodinspection.com.
166. SAE - SAE International; www.sae.org.
167. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
168. SDI - Steel Deck Institute; www.sdi.org.
169. SDI - Steel Door Institute; www.steeldoor.org.
170. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
171. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
172. SIA - Security Industry Association; www.siaonline.org.
173. SJI - Steel Joist Institute; www.steeljoist.org.
174. SMA - Screen Manufacturers Association; www.smainfo.org.

175. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
176. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
177. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
178. SPIB - Southern Pine Inspection Bureau; www.spib.org.
179. SPRI - Single Ply Roofing Industry; www.spri.org.
180. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
181. SSINA - Specialty Steel Industry of North America; www.ssina.com.
182. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
183. STI - Steel Tank Institute; www.steeltank.com.
184. SWI - Steel Window Institute; www.steelwindows.com.
185. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
186. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
187. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
188. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
189. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
190. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
191. TMS - The Masonry Society; www.masonrysociety.org.
192. TPI - Truss Plate Institute; www.tpinst.org.
193. TPI - Turfgrass Producers International; www.turfgrasssod.org.
194. TRI - Tile Roofing Institute; www.tileroofing.org.
195. UL - Underwriters Laboratories Inc.; www.ul.com.
196. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
197. USAV - USA Volleyball; www.usavolleyball.org.
198. USGBC - U.S. Green Building Council; www.usgbc.org.
199. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
200. WA - Wallcoverings Association; www.wallcoverings.org.
201. WASTEC - Waste Equipment Technology Association; www.wastec.org.
202. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
203. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
204. WDMA - Window & Door Manufacturers Association; www.wdma.com.
205. WI - Woodwork Institute; www.wicnet.org.
206. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
207. WWPA - Western Wood Products Association; www.wwpa.org.

C. 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. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. 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. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.

3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. 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. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. ADA - Americans with Disabilities Act Standards for Accessible Design
2. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
3. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
4. DSCC - Defense Supply Center Columbus; (See FS).
5. FED-STD - Federal Standard; (See FS).
6. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.

7. MILSPEC - Military Specification and Standards; (See DOD).
8. USAB - United States Access Board; www.access-board.gov.
9. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.

2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

B. Related Requirements:

1. Section 01 2500 "Substitution Procedures" for requests for substitutions.
2. Section 01 4200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Architect's Approval of Submittal: As specified in Section 01 3300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 3300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

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

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

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

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturers’ disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Provide executed copies of all warranties prior to requesting substantial completion.

2. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
3. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 7700 "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 meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole 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.
2. Limited List of Manufacturers: 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 within the first 60 days after Notice to Proceed unless otherwise indicated.

3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 2500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 7300

EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. Section 01 1000 "Summary" for limits on use of Project site.
2. Section 01 3300 "Submittal Procedures" for submitting surveys.
3. Section 01 7700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

    a. Contractor's superintendent.
    b. Trade supervisor responsible for cutting operations.
    c. Trade supervisor(s) responsible for patching of each type of substrate.
    d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

C. Certified Surveys: Submit two copies signed by land surveyor.

D. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.6 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 3100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive 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 portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 01 7700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

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

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials, dust and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure 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. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 "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. Protection of Existing Items: Provide protection and ensure that existing items remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturers' written instructions for temperature and relative humidity.

END OF SECTION

SECTION 01 7420

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 01 Specification Sections, apply to this Section.

B. As indicated in previous Sections of the Project Manual, this project is pursuing NE-CHPS prerequisites and points. Refer to section 01 81 13.13 CHPS DESIGN REQUIREMENTS for additional information and NE-CHPS scorecard.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

   a. Salvaging nonhazardous construction waste.

   b. Recycling nonhazardous construction waste.

   c. Disposing of nonhazardous construction waste.

   d. Related Requirements: Division 04 Section "Masonry Restoration" for disposal requirements for masonry waste.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.4 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of a minimum of 75 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

   a. Construction Waste (which may include the following when within the project scope):

      i. CMU.

      ii. Lumber.

      iii. Wood trim.

iv. Metals.
v. Roofing.
vi. Insulation.
vii. Carpet and pad.
viii. Gypsum board.
ix. Piping.
x. Electrical conduit.

b. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
i. Paper.
ii. Cardboard.
iii. Boxes.
iv. Plastic sheet and film.
v. Polystyrene packaging.
vi. Wood crates.
vii. Plastic pails.

1.5 ACTION SUBMITTALS

A. Waste Management Plan per CHPS Materials Prerequisite MW 2.0 & Elective Credit 2.1: Submit plan within 30 days of date established for the Notice to Proceed.

1.6 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste. Include the following information:
a. Material category.
b. Generation point of waste.
c. Total quantity of waste in tons.
d. Quantity of waste salvaged, both estimated and actual in tons.
e. Quantity of waste recycled, both estimated and actual in tons.
f. Total quantity of waste recovered (salvaged plus recycled) in tons.
g. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. NE-CHPS Submittal: Per Materials Credits 2.0 & 2.1: Site Waste Management submit:

   a. A copy of the waste management plan developed according to the above criteria

   b. Submit a copy of contract with contractor(s) who will execute the plan.

H. Qualification Data: For waste management coordinator.

1.7 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements as waste management coordinator. Waste management coordinator may also serve as NE-CHPS coordinator.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:

   a. Review and discuss waste management plan including responsibilities of waste management coordinator.

   b. Review requirements for documenting quantities of each type of waste and its disposition.

   c. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.

   d. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

   e. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Use Form CWM-1 for construction waste or equivalent. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste or equivalent. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

D. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.

E. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.

F. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.

G. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.

H. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

I. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

J. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Use Form CWM-5 for construction waste or equivalent. Include the following:

    a. Total quantity of waste.

    b. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.

    c. Total cost of disposal (with no waste management).

    d. Revenue from salvaged materials.

    e. Revenue from recycled materials.

    f. Savings in hauling and tipping fees by donating materials.

    g. Savings in hauling and tipping fees that are avoided.

    h. Handling and transportation costs. Include cost of collection containers for each type of waste.

    i. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

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.

    a. Comply with operation, termination, and removal requirements in Division 01 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.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

    a. Distribute waste management plan to everyone concerned within three days of submittal return.

    b. Distribute waste management plan to entities when they first 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.

a. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Receivers and Processors: Use only available recycling receivers and processors licensed to do business in the local area.

C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.

D. 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.

E. 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.

a. 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. Inspect containers and bins for contamination and remove contaminated materials if found.

b. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

c. Stockpile materials away from construction area. Do not store within drip line of remaining trees.

d. Store components off the ground and protect from the weather.

e. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

A. Packaging:

a. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

b. Polystyrene Packaging: Separate and bag materials.

c. 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.

d. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

a. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

b. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

i. Comply with requirements in Division 32 Section "Plants." for use of clean sawdust as organic mulch.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

a. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

b. Comply with requirements in Division 32 Section "Plants." for use of clean ground gypsum board as inorganic soil amendment.

3.4 DISPOSAL OF WASTE

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

   a. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

   b. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

D. Disposal: Remove waste materials and dispose of at designated spoil areas on Owner's property.

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

END OF SECTION

SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Procedures for list of incomplete work (punch list).
3. Final completion procedures.
4. Warranties.
5. Special warranties.
6. Final cleaning.
7. Repair of the Work.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

A. Prior to requesting the Architect's inspection to determine date of Substantial Completion for each Phase, bring Work to a point where it is ready for Owner's occupancy and in accordance with the definition of "Substantial Completion" in the General Conditions.

1. Complete preliminary procedures and closeout submittals indicated in this Section. Architect will not perform inspection for Substantial Completion unless preliminary procedures and closeout submittals are completed.
2. Submit completed log of closeout activities, with dates of submittal and return entered to show that all items have been seen and, if specified, reviewed by the Architect.

B. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion of a construction phase, complete the following.

1. Complete each closeout activity and submittal required prior to requesting inspection by the Architect. Use log of closeout activities and submittals as checklist and guide to verify that prerequisites are complete.
2. Advise Owner of pending insurance changeover requirements.
3. Make final changeover of temporary construction keying to permanent and deliver keys to Architect for delivery to Owner’s Project Manager. Advise Owner's personnel of changeover in security provisions.

    a. Obtain signed receipt.

4. Complete startup and testing of systems and equipment.
5. Perform preventive maintenance on equipment used prior to Substantial Completion.
6. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment and systems specified in Section 017900 "Demonstration and Training."
7. Advise Owner of changeover in heat and other utilities.
8. Complete final cleaning requirements.
9. Complete touch up and repair work.
10. Remove temporary facilities within the Work area of the construction phase being completed.
11. Replace chipped or broken glass and other damaged transparent materials.
12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or 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.

13. Submit all warranty documentation.

C. Preliminary Procedures for Final Construction Phase: Before requesting inspection for determining date of Substantial Completion of last construction phase for project, complete preliminary procedures required for each phase. In addition, complete the following procedures:

1. Terminate and remove remaining temporary facilities from Project site, including construction field offices, mockups, construction tools, and similar elements.

D. Inspection by Authorities Having Jurisdiction: At least 21 days prior to date anticipated for Substantial Completion, obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases. For phased work, certificates may be temporary as allowed by the authorities having jurisdiction. Include the following as applicable:

1. Certificate of Occupancy.
2. Certificate of inspection for elevators
3. Certificate of inspection for mechanical work.
4. Certificate of inspection for electrical work.

E. Lighting Fixture Cleaning: The Electrical Subcontractor shall clean light fixtures, lamps, globes, lenses and reflectors.

F. HVAC Systems: The HVAC Subcontractor shall remove temporary filters install permanent filters as specified in Division 23 HVAC Sections. The HVAC subcontractor shall submit on a separate sheet, distinct from the Operating and Maintenance data, a list of filters used on the Project, a description of each type, and appropriate location for each type.

1. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
2. Replace disposable air filters with type specified for permanent use and clean permanent air filters.
3. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.

a. Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report upon completion of cleaning.

G. Log of Closeout Activities and Submittals: Submit log listing each activity and submittal that must be completed prior to Substantial Completion of a construction phase. Review each specification section to identify closeout activities and submittals, including certifications, start- up and testing reports, operating and maintenance data, spare parts and extra materials, and training of Owner's personnel.

1. Submit sample log listing each closeout item prior to submitting other closeout submittals.
2. Submit individual logs for each phase of project.
3. Arrange log in tabular format in form acceptable to Architect. Order entries by specification section number and include the following information for each:
   a. Specification section number, name, and paragraph reference.
   b. Type of activity or submittal (such as "test report" or "manual").
   c. Description of the activity or submittal.
   d. Date submitted by the Contractor.
   e. Date returned by the Architect, if Architect's approval is required.
   f. Date transmitted to the Owner.
   g. Remarks.
4. Completed Log: Submit completed log with request for inspection for Substantial Completion.

H. Closeout Submittals: Before requesting inspection for determining date of Substantial Completion of a construction phase, submit closeout submittals specified in this Section and in other Sections; and as listed in the log of closeout activities and submittals prepared by the Contractor. Required closeout submittals include the following:

1. List of items to be completed and corrected (punch list), for attachment to Certificate of Substantial Completion prepared by Architect.
2. Tools, spare parts, extra materials, keys for equipment, and similar items to location designated by Owner. Package carefully and label with manufacturer's name and model number where applicable. Obtain receipt upon delivery.
3. Testing, adjusting and balancing reports, and other reports, specified in Division 23 HVAC Sections.
4. Sustainable design submittals required by Section 018113 "Sustainable Design Requirements."
5. Certified survey specified in Section 017300 "Execution."
6. Report of final inspection by exterminator or pest control company as specified in Section 015050 "Temporary Facilities."
7. Copies of inspection certificates from authorities having jurisdiction.
8. Certifications related to installed work and similar information substantiating that project conforms to the requirements of the Contract Documents and is fully operational.
9. Operation and Maintenance Manuals, as specified in Section 017823 "Operation and Maintenance Data."
10. Special warranties specified in individual specification Sections, in form reasonably acceptable to the Architect.
11. Project Record Documents, as specified in Section 017839 "Project Record Documents."
12. Records of training sessions specified in Section 017900 "Demonstration and Training" to document completion of training.

I. Closeout Submittals for Final Construction Phase: Before requesting inspection for determining date of Substantial Completion of last construction phase for project, submit closeout submittals specified in this Section and in other Sections indicated to be submitted for each phase. In addition, submit the following:

1. Change-over information related to Owner's occupancy, use, operation and maintenance, including final meter readings, if applicable.
2. Consent of surety to payment at the time of Substantial Completion.
3. Contractor's project warranty required by General Conditions as amended.

1.4 PROCEDURES FOR LIST OF INCOMPLETE WORK (PUNCH LIST)

A. Contractor's List of Incomplete Work (Punch List): Prepare a comprehensive, detailed punch list of incomplete work, including each trade and each part of the project. Prepare list in form acceptable to the Architect; incomplete punch lists will be returned to the Contractor without action.
   1. Prepare list using the project management software system, in version acceptable to the Architect.
   2. Submit in electronic format as an editable excel file.
   3. Format: Tabular format, with work listed room by room. Include columns for the following information:
      a. Room number.
      b. Room name.
      c. Description of the item of work.
      d. Trade responsible for item of work.
      e. Signature and date of the supervisor or responsible party for each trade, who shall initial punch list to indicate item has been completed.
      f. Remarks.
      g. Cost to complete item.
   4. Organization:
      a. Include the following information at the top of each page:
         1) Project name.
         2) Date.
         3) Name of Architect and Owner's Project Manager.
         4) Name of Contractor.
         5) Page number.
      b. Organize punch list into separate pages for work related to building interior, building exterior and roof, and the project site.
      c. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
      d. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

B. Request for Inspection: Submit a written request for inspection to determine Substantial Completion to the Architect a minimum of 10 days prior to the date the work will be completed and ready for final inspection and tests. After submitting request, continue to diligently pursue completion of items on punch list. Include the following with request:
   1. Electronic copy of the Contractor's list of incomplete Work.
   2. Certification letter that final cleaning is complete, preliminary activities and close-out submittals are complete, and that work is ready for inspection.

C. On receipt of request for inspection, Architect and Owner's Project Manager will either proceed

with inspection or notify Contractor of unfulfilled requirements.

1. Architect will not inspect the Work in parts or by systems. Entire Work of the phase must be ready for inspection prior to Architect commencing inspection.
2. If the Architect finds that the Contractor's list of incomplete Work contains items that are not minor in nature, the Architect will notify the Contractor and the Contractor shall complete or correct such work prior to the Architect's inspection.
3. If the Architect begins the inspection and finds items that are incomplete and not minor in nature, the Architect will notify the Contractor and suspend the inspection until the Contractor completes or corrects such work.
4. Final cleaning must be complete prior to the Architect's inspection. If the entirety of the building is not white glove clean then the project will not be considered ready for inspection.
5. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

D. Architect's Inspection: Architect will complete inspection of completed Work and may add additional items to the punch list prepared by the Contractor. Architect will transmit the revised punch list to the Contractor.

1. Preparation of the Architect's punch list is not a Certificate of Substantial Completion, nor an affirmation that the Work is substantially complete, nor is the date of the list to be construed as the Date of Substantial Completion.

E. Prepare copies of the punch list applicable to each room or space and post in each room in conspicuous place. Require each tradesperson performing work to sign and date the posted list in space provided beside each item when the item completed. Monitor progress of completion and verify that trades are signing punch list upon completion of items.

F. Certificate of Substantial Completion: Architect will prepare the Certificate of Substantial Completion after inspection and upon Contractor's completion of closeout activities and closeout submittals. Issuance of the Certificate of Substantial Completion and determination of the date of Substantial Completion are at the sole discretion of the Architect.

G. Monetization of Punch List: Prior to Final Completion, cooperate with the Architect in preparation of a monetized punch list, indicating the cost to complete each incomplete item, with total.

1.5 FINAL COMPLETION PROCEDURES

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01 2900 "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. 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 and Owner’s Project Manager 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.

C. Final Closeout Submittals: Prepare remaining closeout submittals and submit to the Architect prior to Final Completion, allowing sufficient time for review, at least 15 working days.
   1. Final construction photographs.
   2. Certificate of insurance for products and completed operations.
   3. Consent of Surety to Final Payment.
   4. An affidavit certifying that bills and indebtedness connected with the Work have been paid.
   5. Waivers of lien from all subcontractors and suppliers, or a bond satisfactory to the Owner indemnifying Owner against all liens or other claims.
   6. Proof that taxes, fees and similar obligations have been paid.
   7. Additional change-over information which may be required by Owner's lender and Owner's property insurer.

D. Signed and Dated "Punch Lists": Complete items which are listed as incomplete on the Contractor's list of incomplete work and those listed on the Architect's list of incomplete work attached to the Certificate of Substantial Completion; or, if acceptable to the Owner's Project Manager, furnish assurance that Work not complete and accepted will be completed without delay.
   1. As evidence of completion of this work, submit to the Architect the originals of the lists which were posted on site and which have been signed and dated item-by-item to indicate completion of all the work listed.

E. Remove remaining construction facilities, temporary controls, and tools.

F. Reclean to standards specified for cleaning. Remove surplus materials and rubbish. Notify the Architect and Owner's Project Manager in writing that this cleaning has been completed.

G. Submit Final Application for Payment.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. For work listed as "incomplete" at time of Substantial Completion, warranties required by the Contract Documents shall commence when such work is accepted as complete by the Architect, unless an exception is specifically made in the Certificate of Substantial Completion.

C. Assemble two executed copies of each warranty, bond, and service and maintenance contract applicable to the project. Include Contractor's Project Warranty required by the General Conditions, and manufacturer's standard warranties and special warranties specified in individual specification Sections.

D. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Bind warranties, special warranties, and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
3. Inside Title Page: Repeat information on the cover and identify Contractor, name of responsible principal, address and telephone number.
4. Provide table of contents for each volume, arranged in systematic order, neatly typewritten.
5. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
6. 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 table of contents at beginning of document.

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

F. Submittal: Acceptance by the Architect is a prerequisite to Substantial Completion.
1. Submit one review copy of fully compiled warranties in final form. The Architect will review the copy and return it with comments.
2. Upon review and acceptance by the Architect, resubmit two corrected bound copies.

G. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

PART 2 - PRODUCTS

2.1 MATERIALS

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

1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a 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 with HEPA-filtered vacuum, removing debris and excess nap; shampoo if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in both sides of doors, windows, storefront, and curtain wall. Reclean windows, storefront, and curtain wall initially cleaned under the Work of Division 08 Sections. Polish mirrors and glass, taking care not to scratch surfaces. Remove glazing compounds and other noticeable, vision-obscuring materials.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Clean exposed surfaces of diffusers, registers, and grills.
o. Leave Project clean and ready for occupancy.

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.

END OF SECTION

SECTION 01 7701

WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1. Specific requirements for warranties for the Work, products, and installations that are specified to be warranted, are included in the individual Specification Sections of Divisions 2 through 48.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 WARRANTY REQUIREMENTS

A. Provide written warranty for all Work under this section in addition to special warranties required in individual Specification Sections of Division 2 through 48 as required in the Owner's General Conditions of the Contract or the Supplemental General Conditions of the Contract.

B. Regardless of whether warranty requirements for all work under this contract are stipulated in the Owner's General Conditions of the Contract or the Supplemental General Conditions of the Contract, provide minimum two-year warranty from Substantial Completion for all work under this Contract unless otherwise stipulated in individual Specification Sections in Division 2 through 48.

C. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work, at no cost to Owner.

D. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

E. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefitted from use of the Work through a portion of its anticipated useful service life.

F. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

G. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.4 SUBMITTALS

A. Submit written warranties to the Architect. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work upon request of the Architect, submit written warranties confirming this commencement date.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen days of completion of that designated portion of the Work.

B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.

1. Refer to individual Sections of Divisions 2 through 48 for specific content requirements, and particular requirements for submittal of special warranties.

C. Form of Submittal: Compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

D. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.

2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.

3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION

SECTION 01 7830

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:
   a. Record Drawings.
   b. Record Specifications.
   c. Record Product Data.
   d. Miscellaneous record submittals.

B. Related Requirements:
   a. Division 01 Section "Execution" for final property survey.
   b. Division 01 Section "Closeout Procedures" for general closeout procedures.
   c. Divisions 02 through 26 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   a. Number of Copies: Submit one set(s) of marked-up record prints.
   b. Number of Copies: Submit copies of record Drawings as follows:
      i. Initial Submittal:
         1. Submit PDF electronic files of scanned record prints.
         2. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
      ii. Final Submittal:
         1. Submit three paper-copy set(s) of marked-up record prints.
         2. Submit PDF electronic files of scanned record prints.
         3. Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one paper copy annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 7900

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.3 INFORMATIONAL 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 in lieu of video recording of live instructional module.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Construction Manager.

e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
4. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 01 7823 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

1.6 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. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 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. Systems and equipment operation manuals.
c. Systems and equipment maintenance manuals.
d. Product maintenance manuals.
e. Project Record Documents.
f. Identification systems.
g. Warranties and bonds.
h. 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.
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.

1.8 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 Section 01 7823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner's operational philosophy.
3. Owner will furnish Contractor with names and positions of participants.

C. 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.

D. 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.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral performance-based test.

F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.

1. Submit video recordings by uploading to web-based Project software site.
2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

    a. Name of Contractor/Installer.
    b. Business address.
    c. Business phone number.
    d. Point of contact.
    e. Email address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

    a. Produce segments to present a single significant piece of equipment per segment.
    b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by audio narration by microphone while or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 8113

NECHPS DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section includes special Project administrative and procedure requirements related to the State of Rhode Island program for energy conservation and efficiency, indoor air quality, and natural resource efficiency which are in compliance with the Northeast High Performance Green Schools Guidelines: Criteria, (referred to herein as “CHPS, or NECHPS”). The Owner has established minimum CHPS credit points to achieve which will provide the Owner with a reimbursement funding grant necessary for completion of this Project. The General Contractor and (and subcontractors) shall, as part of the Contract with Owner, comply with requirements of CHPS in the performance of the Work. The General Contractor, as a minimum, shall implement the following:

   a. General Contractor shall designate a “Contractor’s CHPS Representative” who will assist the Owner and Architect with fulfilling documentation and submittals which are required by CHPS.

   b. Provide products that minimize consumption of non-renewable resources, consume reduced amounts of energy and minimize amounts of pollution to produce, and employ recycled and/or recyclable materials.

   c. Provide verification that materials used have been reviewed for environmental considerations as specified.

   d. Maintain a materials log.

   e. Conduct special meetings.

   f. Provide building commissioning plan in conjunction with General Commissioning Specification.

   g. Control environmental air quality pollutants by controlled selection of materials and processes used in project construction in order to attain acceptable indoor air quality as specified.

B. Contractor shall follow specified compliance requirements in conjunction with environmental quality requirements specified in other individual specification sections. Notify Owner and Architect if conflicts arise between performance of the work and environmental goals. This specification is not intended to limit alternative means of achieving these goals. Suggestions and input from the General Contractor and subcontractors for implementing these goals are encouraged.

1.3 RELATED SECTIONS

A. Section 01 2500 - SUBSTITUTION PROCEDURES.

B. Section 01 3100 - PROJECT COORDINATION:
    a. Preconstruction, progress and special project meeting requirements regarding CHPS Certification.
C. Section 01 3300 - SUBMITTAL PROCEDURES:
    a. CHPS Certification Report
    b. Environmental product certifications.
D. Section 01 6000 - PRODUCT REQUIREMENTS.
E. Section 01 7420 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
F. Section 01 7700 - CLOSEOUT PROCEDURES.

1.4 DEFINITIONS

A. The term “CHPS” as used herein and throughout the Project Manual refers to the Northeast High Performance Green Schools Guidelines: Criteria, Version 3.1, issued August 2014.
B. Regionally Manufactured Materials: Materials that are manufactured within a radius of 500 miles (800 km) from the project location. Manufacturing refers to the final assembly of components into the building product that is installed at the project site.
C. Regionally Extracted, Harvested, or Recovered Materials: Materials that are extracted, harvested, or recovered and manufactured within a radius of 500 miles (800 km) from the project site.
D. Recycled Content: The percentage of weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (preconsumer), or after consumer use (post-consumer).
    a. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production or the same product are not recycled materials.
    b. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

1.5 CONTRACTOR’S CHPS REPRESENTATIVE

A. The General Contractor shall designate a CHPS Representative, acceptable to the Owner, experienced in construction management and waste-recycling documentation. The Contractor’s CHPS Representative is responsible for implementation, coordination, and documentation of specified CHPS Credit Requirements.
B. The Contractor’s CHPS Representative is responsible for overseeing the Owner’s environmental goals for this Project during construction.
C. The Contractor’s CHPS Representative shall attend all Environmental Quality Review Meetings,
D. Project Progress Meetings (at least monthly), Pre-installation Meetings, and Special Meetings regarding environmental issues through-out the term of construction as specified in Section.
E. Prior to the start of on-site Work, the Contractor’s CHPS Representative shall distribute copies of the CHPS certification requirements and credit goals to the Construction Project Team (Project Manager and Project Superintendent), and each applicator, installer, and supplier involved with the Project.
    a. Copies of the distribution list shall be furnished to the Owner’s on-site Representative, the Owner’s Project Representative, and the Architect. Update distribution list as additional applicators, installers, and suppliers are contracted, re-issue as distribution list is revised.

1.6 CHPS CERTIFICATION PLAN

A. Submit to Architect a written plan for achieving the specified CHPS Credit Certification requirements within 14 calendar days of Notice to Proceed. Plan shall include a written narrative describing proposed procedures to be implemented.

B. Contractor shall submit to Architect 2 copies of a CHPS Certification Progress Report each month throughout the work. Include a written narrative describing progress to date.

1.7 GENERAL CHPS CREDIT REQUIREMENTS

A. Contractor shall submit CHPS certification documentation demonstrating compliance with the corresponding CHPS Credit Requirements. Submit CHPS documentation under provisions of Section 01 3300 - SUBMITTAL PROCEDURES.

   a. The following is an overview schedule of Credit Requirements for which the Contractors shall contribute to CHPS certification. The schedule is provided as a guide and does not supersede CHPS Certification requirements specified in individual Specification Sections.

   b. Submission of CHPS documentation is separate and additional to, progress schedules, product literature submittals, samples, mock-ups, commissioning and all other project related submittals required under other Division One Specification Sections and individual Specification Sections.

B. The CHPS Credit Requirements for CHPS compliance are in addition to environmental quality requirements specified elsewhere in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 8113.43

GREEN CONSTRUCTION PROTOCOLS (GCP)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 01 Specification Sections, apply to this Section.

B. As indicated in previous Sections of the Project Manual, this project is pursuing NE-CHPS prerequisites and points. Refer to section 01 81 13 CHPS DESIGN REQUIREMENTS for additional information and NE-CHPS scorecard.

C. References

   a. U.S. Dept. of Health and Human Services Review of Technology Available to the Underground Mining Industry for Control of Diesel Emissions: http://www.cdc.gov/niosh/mining/works/coversheet1173.html

1.2 SUMMARY

A. This Section includes general requirements and procedures to adopt the “Green During Construction’ protocol by reducing particulate matter, dust and silicates and toxic gases.

B. Related Sections include the following:

   a. Divisions 01 through 26 Sections for requirements specific to the Work of each of those Sections. These requirements may or may not include reference to Green Construction Protocols (GCP)

1.3 DEFINITIONS AND PERFORMANCE GOALS

A. GCP: Green Construction Protocols.

   a. Diesel Emission Controls in Construction Projects: Require the highest level of emission control available. The model sets reduction thresholds that reflect the current state of retrofit technology for different types of engines while acknowledging that the technology continues to improve. It therefore links an increased level of control—from technology that achieves at least a 20% reduction in diesel particulate matter (PM) to technology that achieves at least an 85% reduction—to the dates when new engines must comply with the higher standards and are available as an option. The document also signals to contractors that a higher level of control is likely to be required in later contracts and thus encourages early adoption of the more advanced technology where feasible.

   b. Include the widest range of diesel on road vehicles, nonroad equipment, and generators. Although high-horsepower engines emit more pollutants, there are far more low-horsepower engines in the fleets.

   c. Implement and/or enforce idle-reduction policies.

   d. Require the use of ultra-low sulfur diesel fuel, which is widely available.

PART 2 - PRODUCTS

PART 3 – EXECUTION

3.1 EXHAUST EMISIONS PROTOCOLS

A. Diesel 1. All Contractor and Sub-Contractor diesel-powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above, which is located or used on the project for a period in excess of 20 working days, shall be retrofitted with Emission Control Devices in order to reduce diesel emissions. In addition, all motor vehicles and construction equipment shall comply with all pertinent local, state and federal regulations covering exhaust emission controls and safety. For best diesel retrofit technology refer to www.northeastdiesel.org. The Emission Control Devices must be either included on the Environmental Protection Agency (EPA) Verified Retrofit Technology List (www.epa.gov/otaq/retrofit/retroverifiedlist.htm) or bejudged by the Owner to be equivalent to the EPA standards.

   a. All diesel fuel used on the project site must be ultra low sulfur diesel which contains no more than 15 parts per million (ppm) sulfur.

   b. Turn off diesel combustion engines on construction equipment and trucks not in active use.

B. Gas

   a. Use portable gasoline powered generators only if they have catalytic converters.

   b. Carbon monoxide meters should be located in areas where any gasoline equipment is in use and set to alarm at 25ppm.

   c. Use electric equipment in place of gasoline powered equipment.

   d. Electric scissorlifts replace gas powered.

   e. Electric heaters replace propane or gas powered blowers.

   f. Turn off gasoline powered cars, trucks and equipment that are not in active use.

C. Locate diesel and gasoline powered equipment away from building air intakes, air conditioners and windows (sensitive receptors).

3.2 IDOLING PROTOCOLS

A. Restrict idling of gasoline and diesel vehicles. Diesel idling is already prohibited under state law, though it is frequently ignored. No such rule exists for gasoline equipment though such equipment and vehicles are a major cause of carbon monoxide poisoning.

B. Compliance:

   a. Turn off diesel combustion engines on construction equipment not in active use, and on trucks that are idling while waiting to load or unload material for five minutes or more, as stipulated in the RI anti-idling law which contains the following exceptions: vehicles being serviced, vehicles making deliveries that need to keep their engines running (to power refrigerators, for example), and vehicles that need to run their engines to operate accessories.

   b. Turn off gasoline combustion engines on construction equipment and vehicles not in active use, and on trucks that are idling while waiting to load or unload material for five minutes or more.

   c. Locate diesel and gasoline equipment away from sensitive receptors (e.g., standing air intakes for adjacent structures.)

3.3 DUST/SILICA SUPPRESSION PROTOCOLS

A. Apply dust suppression controls, especially silica control measures, during construction. Water spray dust control measures have been shown to reduce respirable crystalline silica dust during various construction and mining operations worldwide. Equipment removes silicate particles from the air, while general purpose sprinklers reduce the settled dust on surfaces and area. Landscaping policy can minimizes destruction to standing foliage etc. to reduce general dust exposures. [RI DEM has a fugitive dust rule that restricts offsite community exposure.]

B. Targeted work activities include:
    a. Abrasive blasting.
    b. Sawing, drilling, grinding, concrete and masonry.
    c. Demolition of concrete/ masonry.
    d. Removing paint and rust with power equipment.
    e. Dry sweeping or air blowing of concrete rock sand dust.
    f. Jack hammering on concert, masonry and other surfaces.

C. Housekeeping activities: Prohibit dry sweeping and use of air pressure to cleanup. To reduce dust exposures, use an appropriate sweeping compound and assure that the persons doing the sweeping wear appropriate dust masks and that they are properly trained in their usage.

END OF SECTION

SECTION 02 4100

DEMOLITION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the Contract and General Conditions and all Sections within Division 1 General Requirements, which are hereby made a part of this Section of the Specifications.

B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the contract and general conditions.

1.2 DESCRIPTION OF WORK

A. Work Included:

1. Demolition and removal of buildings and structures and as required for new work. Refer to the Drawings for additional requirements.
2. Demolition and removal of selected site elements and as required for new work. Refer to the Drawings for additional requirements.
3. Salvage of existing items to be reused or turned over to the facility.
4. Removal and legal disposal of demolished materials off site. Except those items specifically designated to be relocated, reused, or turned over to the facility, all existing removed materials, items, trash and debris shall become property of the Contractor and shall be completely removed from the site and legally disposed of at her/his expense. Salvage value belongs to the Contractor. On-site sale of materials is not permitted. Demolition and removal work shall properly prepare for alteration work and new construction to be provided under the Contract.
5. File all necessary notices, obtain all permits and licenses, and pay all governmental taxes, fees, and other costs in connection with the work. Obtain all necessary approvals of all governmental departments having jurisdiction.
6. The Contractor, in the presence of the Architect or Owner, shall take photographs or record a video tape of existing conditions adjacent to the site, including sidewalks, curbing, utility structures, light poles, and other features.
7. Removal and recycling/disposal of demolished materials are at the Contractor's expense. Except for those items specifically designated to be turned over to the Owner, all existing removed materials, items, trash, and debris shall become the property of the Contractor and shall be completely removed from the site and legally disposed, recycled, and salvaged at the Contractor's expense. Onsite sale of material is not permitted.
8. Participation in manufacturer Sustainability Take-back programs are recommended if available.
9. Protection of site structures and features that are designated to remain.
10. Refer to project requirements on drawings for selective demolition. Coordinate activities to prevent damages to adjacent properties during selective demolition.
11. Maintenance, watering and care of trees designated to remain by a certified arborist during the construction period.

1.3 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 the Authority ready for reuse, at a location designated by the Authority. Protect from weather until accepted by Authority.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated. Protect from weather until reinstallation.

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.

1.4 REFERENCE STANDARDS

A. American National Standard Institute, A10.6-2006, Safety Requirements for Demolition for Construction and Demolition Operations.

B. National Fire Protection Association, 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.5 SCHEDULE

A. The Contractor shall develop a demolition schedule for each phase of the work prior to the Pre-Construction Conference. The Owner and Architect shall approve any proposed alterations the work sequence to meet the specific needs of the project.

B. The Contractor shall not perform total or selective demolition of the building until A Certificate of Abatement has been issued which could take up to 90 days after the Notice to Proceed for this project.

C. The Contractor shall update the schedule and submit any schedule changes for review by the Architect at the weekly construction meetings.

1.6 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition that all recyclable demolition material shall be recycled and non-recyclable material shall be disposed at an approved facility.

1.7 SUBMITTALS

A. The Contractor shall submit each item in this Article according to the Conditions of the Contract for information only, unless otherwise indicated.

B. Shop Drawings:

1. Scaffolding details

C. Quality Control Submittals (prior to commencement of onsite demolition):
   1. Methods of demolition and equipment proposed to demolish structure. Demolition means and methods must be approved by the Owner and Owner's Structural Engineer.
   2. Waste Management Plan to indicate the types of wastes to be removed from the project and the proposed reuse, recycling, treatment and disposal locations. Include names and addresses of back-up reuse, recycling, treatment and disposal facilities.
   3. Copies of any authorizations and permits required to perform the work, including disposal/recycling facility permits.
   4. Contract Closeout Submittals (throughout project and prior to authorization of final payment):
      a. Records of the amounts of waste generated, by waste type and facilities where these materials were shipped for reuse, recycling, treatment and/or disposal.
      b. Evidence (shipping manifests and weight receipts) of lawful reuse, recycling, treatment or disposal of all wastes generated.

D. Schedule of Demolition Activities:
   1. Detailed sequence of demolition and removal work, with early and late starting and finishing dates for each activity. Ensure onsite operations are uninterrupted if applicable.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Locations of proposed dust- and noise-control temporary partitions and means of egress.
   5. Means of protection for items to remain and items in path of waste removal from building.

E. Inventory: After demolition is complete, submit a list of items that have been removed and salvaged and where the material will be delivered for disposal and/or recycling including participation in any manufacturer take-back programs.

F. Pre-Demolition Photographs or Videotapes: Show existing conditions in sufficient detail of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

G. Disposal Records: Provide material shipping records and/or waste manifests (i.e., for offsite waste management) indicating receipt and acceptance of solid by the disposal facility.

1.8 REGULATORY REQUIREMENTS

A. The Contractor is solely responsible for obtaining permits or approvals which may be required to perform the work of this section, including all costs, fees and taxes required or levied. Notify and obtain such permits or approvals from all agencies having jurisdiction over demolition prior to starting work including, but not limited to local, state and federal agencies.

B. Comply with all applicable federal, state, and local safety and health requirements regarding the demolition of structures and other site features as applicable.

C. Notify the Owner and Architect immediately upon discovery of any hazardous materials detected on site after Certificate of Abatement has been issued.

1.9 QUALITY ASSURANCE

A. Examination of Existing Conditions: The Contractor shall examine the Drawings for demolition and removal requirements and provisions for new Work. Verify all existing conditions and dimensions before commencing Work. The Contractor shall visit the site and examine the existing conditions and shall inform herself/himself of the character, extent and type of demolition and removal Work to be performed. The Contractor shall submit any questions regarding the extent and character of the demolition and removal work in the manner and within the time period established for receipt of such questions during the bidding period.

B. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

C. Pre-demolition Conference: Conduct conference at the Site. Review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by demolition operations.

1.10 PROJECT CONDITIONS

A. The Owner/Architect/Engineers assume no responsibility for actual condition of buildings to be demolished.

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials required to complete the work under this Section shall conform to the standards and requirements of local codes, ordinances, municipalities, regulatory agencies, utility companies and other agencies having jurisdiction over the work to be performed.

2.2 SALVAGING

A. Salvaged for Reinstallation: Materials indicated on the Drawings or otherwise designated in writing by the Authority to be salvaged and reinstalled shall be carefully removed and stored at a location acceptable to the Engineer and Authority.

B. Salvaged for Storage: Materials indicated on the Drawings or otherwise designated in writing by the Authority to be salvaged and stored shall be carefully removed and delivered to the Authority at locations determined by Authority.

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 Engineer.

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 the 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 DEMOLITION

A. All demolition debris is to be disposed offsite at an appropriate waste disposal and/or recycling facility. No crushing operations will be permitted on the site except as necessary to reduce material to a size suitable for offsite shipment.

B. Removed Items:

1. Pack or crate items after cleaning. Label and identify contents of containers.
2. Store items in a secure area until delivery to Authority.
3. Transport items to storage area designated by the Authority.
4. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean items and perform minor repair due to removal, and restore to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Label and 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.

D. Removed items for manufacturer sustainable take-back program participation.

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

F. Items for Re-use and Preservation of Existing Surfaces to Remain:

1. The Contractor shall inspect closely each item specifically designated to be relocated, re-used, or turned over to the Authority prior to its removal, and immediately report damages and defects to the Engineer and the Authority. The Contractor shall be responsible for any subsequent damage to the same other than latent defects not readily apparent from close inspection, and shall bear responsibility for its repair or same replacement as directed by the Engineer, to the satisfaction of the Authority.
2. Unless special surface preparation is specified under other Specification Sections, leave existing surfaces that are to remain in a condition suitable to receive new materials and/or finishes.

3.3 PROTECTION OF PUBLIC AND PROPERTY

A. Provide all measures required by federal, state and municipal laws, regulations, and ordinances for the protection of surrounding property, the public, workmen, and Authority's employees during all demolition and removal operations. Measures are to be taken, but not limited to installation of sidewalks, sheds, barricades, fences, warning lights and signs, trash chutes and temporary lighting.

B. Protect all walks, roads, streets, curbs, pavements, trees and plantings, on and off premises, and bear all costs for correcting such damage as directed by the Engineer, and to the satisfaction of the Authority.

C. Demolition shall be performed in such a manner that will insure the safety of adjacent property. Protect adjacent property from damage and protect persons occupying adjacent property from injuries which might occur from falling debris or other cause and so as not to cause interference with the use of other portions of the building, of adjacent buildings or the free access and safe passage to and from the same.

D. Every precaution shall be taken to protect against movement or settlement of the building, of adjacent buildings, sidewalks, roads, streets, curbs and pavements. Provide and place at the Contractor's own expense, all necessary bracing and shoring in connection with demolition and removal work.

E. Remove portions of structures with care by using tools and methods that will not transfer heavy shocks to existing and adjacent building structures, both internal and external of the particular work area.

F. Provide and maintain in proper condition, suitable dust barriers around areas where interior demolition and removal work is in progress. Dust barriers shall prevent the dust migration to adjacent areas. Remove dust barriers upon completion of major demolition and removal in the particular work area. If indicated in the construction documents as such, these barriers shall be fire resistive.

3.4 DISCOVERY OF HAZARDOUS MATERIALS

A. If hazardous materials, such as chemicals, asbestos-containing materials, or other hazardous materials are discovered during the course of the work, cease work (in affected area only) and immediately notify the Engineer and the Authority of such discovery. Do not proceed with work in such areas until instructions are issued by the Engineer. Continue work in other areas.

B. If unmarked containers are discovered during the course of the work, cease work (in the affected area only) and immediately notify the Engineer and the Authority of such discovery. Do not proceed with work in such areas until instructions are issued by the Engineer. Take immediate precautions to prohibit endangering the containers integrity. Continue work in other areas.

3.5 CUTTING

A. Perform all cutting of existing surfaces in a manner which will ensure a minimal difference between the cut area and new materials when patched. Use extreme care when cutting existing surfaces containing concealed utility lines which are indicated to remain and bear full responsibility for repairing or replacement of all such utilities that are accidentally damaged.

B. Provide a flush saw cut edge where pavement, curb and concrete removals abut new construction work or existing surfaces to remain undisturbed.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Premises shall be left in a clean condition and ready to accept alteration work and new construction.

3.7 DISPOSAL

A. Disposal of Demolition Materials Removed from Site - Reuse, recycle, treat and dispose all materials from demolition (i.e. metals, wood, concrete, miscellaneous waste, etc.) as well as all equipment and other materials that are within the building. The loading of demolition materials shall be performed in a manner that prevents materials and activities from generating excessive dust and ensure minimum interference with roads, sidewalks and streets both onsite and offsite.

END OF SECTION

SECTION 05 7313

GLAZED DECORATIVE METAL RAILING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Monolithic Tempered Glass Dry Glazed Railing Assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of railings assembled from standard components.

2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, and attachment details.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.3 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockups for each form and finish of railing consisting of glass panels, and anchor- age system components.

1.4 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. 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.

B. Coordinate installation with adjacent finishes to prevent damage to railing components.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not suit structural performance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Geobezdan Stainless

B. Wagner Companies basis of design (Standoff Pin Mounted)

C. CR Laurance Company

D. Carvart

2.2 PERFORMANCE/DESIGN CRITERIA

A. Basis of Design

1. Bezdan Stainless Standoffs with ½" Clear SGP laminated glass panels.

2. Assembly:

a. 50 plf (0.73 kN/m), on the top in all directions.

b. 200 lbs. (0.89 kN), on top rail all directions or 50 lbs. (0.22 kN) on 1 square foot at all locations perpendicular to the glass balustrade.

c. Loads not applied simultaneously.

2.3 METALS, GENERAL

A. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

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

C. Coordinate with electrical for integral lighting.

2.4 MATERIALS

A. Aluminum Components: Conforming to ASTM B 221/ASTM B221M, Alloy 6063- T52

B. Stainless Steel Components: Conforming to ASTM A 666, Type 304

2.6 COMPONENTS

A. Safety Glazing: Glazing shall comply with 16 CFR 1201, Category II.

B. Glass Standoff: Bezdan 1 ½" diameter standoff. Part number 6152, stainless steel 304.

1. Finish: Matte Black

C. Glazing: ½" SGP Laminated

1. Color: Clear

2.7 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. Stainless-Steel Components: Type 304 stainless-steel fasteners.

2. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.

3. Dissimilar Metals: Type 304 stainless-steel fasteners.

B. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193[or ICC-ES AC308].

1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 (A4) stainless-steel bolts, ASTM F 593 (ASTM F 738M),and nuts, ASTM F 594 (ASTM F 836M).

2.8 MISCELLANEOUS MATERIALS

A. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Shop Primers: Provide primers that comply with Division 09 Section "Exterior Painting" and Section "High-Performance Coatings."

2.9 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

C. Welded Connections: Cope components at connections to provide close fit, or use fittings de- signed for this purpose. Weld all around at connections, including at fittings.

1. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds; no evidence of a welded joint.

D. Form changes in direction by inserting prefabricated elbow fittings.

E. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting,

cracking, or other- wise deforming exposed surfaces of components.

F. Close exposed ends of hollow railing members with prefabricated end fittings.

G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work where indicated.

2.10 GLAZING PANEL FABRICATION

A. General: Fabricate to sizes and shapes required; provide for proper edge clearance and bite on glazing panels.

1. Grind smooth exposed edges, including those at open joints, to produce square edges with slight chamfers at junctions of edges and faces.

B. Structural Balusters: Provide tempered or laminated, heat-strengthened glass panels.

2.11 STAINLESS-STEEL FINISHES

A. Directional Satin Finish: No. 4.

2.12 METAL FINISHES

A. Preparing Non-galvanized Items for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

B. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

C. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.

1. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating

metals and other materials from direct contact with incompatible materials.

D. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout.

E. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout.

F. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members.

END OF SECTION

SECTION 06 1000

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Wood blocking, cants, and nailers.
   2. Trim.
   3. Plywood backing panels.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

   1. NeLMA: Northeastern Lumber Manufacturers' Association.
   2. NHLA: National Hardwood Lumber Association.
   3. NLGA: National Lumber Grades Authority.
   4. SPIB: The Southern Pine Inspection Bureau.
   5. WCLIB: West Coast Lumber Inspection Bureau.
   6. WWPA: Western Wood Products Association.
   7. APA: American Plywood Association.

1.4 ACTION SUBMITTALS

A. Initial Submittal: Within 30 days of award the subcontractor must submit a complete list of all the materials including manufacturers, and model numbers where applicable, and lead times to be used to allow for timely delivery of materials.

B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include

physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. 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. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

B. Store, stack, and handle engineered wood products to comply with recommendations of APA EWS E705.

1. Store wrapped or banded together until ready for installation, on level well-drained area. Do not store in direct contact with the ground. Use stickers to separate bundles, spaced as recommended in writing by manufacturer.
2. Do not stack other material on top of structural composite lumber or I-joists.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Regional Materials: Dimension lumber shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site. If materials are transported by rail or water, the distance transported by rail or water shall be multiplied by 0.25 to determine the distance to Project site.

B. Certified Wood: Lumber and plywood shall be made from certified wood tracked through a chain- of-custody process. Certified wood documentation shall be provided by sources certified through a forest certification system with principles, criteria, and standards developed using ISO/IEC Guide 59 or the World Trade Organization's "WTO Agreement on Technical Barriers to Trade."

C. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each quality grade specified unless otherwise indicated.

1. Recycled Content of Medium-Density Fiberboard and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
2. Composite Wood and Agrifiber Products: Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Low-Emitting Materials: Composite wood products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. 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.
4. Provide dressed lumber, S4S, unless otherwise indicated.

F. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less, 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Wood blocking in contact with masonry, exterior work, and roof blocking, shall be pressure treated lumber.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-

test- response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

E. Application: Treat items indicated on Drawings, and the following:

1. All backing panels.
2. All framing, blocking, furring or other wood product installed within walls or otherwise concealed by a wall system, millwork, or other finish.
3. All plywood panels part of a wall system (concealed and exposed)

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Specialty framing for millwork and interior carpentry.
3. Nailers.
4. Cants.
5. Furring.

B. For framing and substructure of millwork or finish carpentry items provide No .1 grade lumber of any species.

C. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.

D. For concealed boards, provide lumber with 19 percent maximum moisture content.

E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Electrical, Data, and Telecom Equipment Backing Panels: Panels: PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness, at backing panels and as indicated.

1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
2. Finish: Field painted in white at all six sides by Division 09 “Painting”

B. Backer panels for flush wood paneling 5/8 inch thickness, B-Grade plywood, Fire-retardant treated, painted by Div 9 painting in color as indicated on schedule

C. Concealed backer panels within wall assemblies 5/8 inch thickness unless otherwise noted, C-Grade plywood, Fire-retardant treated

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
2. Provide lag screws or lag bolts with countersunk head in wood where pre-drilled holes are provided in steel framing for fastening wood blocking.
3. Provide self-tapping screws or power actuated fasteners for fastening wood to steel where pre-drilled holes are not provided in steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Metal Framing: ASTM C 1002 at non-structural metal studs, or ASTM C 954 at cold form framing, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1.

G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.7 METAL FRAMING ANCHORS

A. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

B. Hot-Dip Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

C. Stainless-Steel Sheet: ASTM A 666, Type 304.

1. Use for exterior locations and where indicated.

2.8 MISCELLANEOUS MATERIALS

A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

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

E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Do not splice structural members between supports unless otherwise indicated.

G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches on center

H. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches on center with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches on center Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet on center

I. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

J. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. ESR-1539 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

1. Provide blocking for attachment of each individual item of subsequent work; attachment of work directly to wall and ceiling finish materials is not permitted. Size blocking to withstand imposed loads of attached items, including live loads.
2. Coordinate with work of Section 05 40 00 "Cold-Formed Metal Framing," Section 092119 "Gypsum Board Shaft Wall Assemblies," and Section 09 22 16 "Non-Structural Metal Framing."

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring horizontally and vertically at 24 inches on center

C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches on center

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 07 8413

PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.
4. Penetration labeling and identification

1.3 ACTION SUBMITTALS

A. Initial Submittal: Within 30 days of award the subcontractor must submit a complete list of all the materials including manufacturers, and model numbers where applicable, and lead times to be used to allow for timely delivery of materials.

B. Product Data: For each type of product indicated.

C. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire- resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm 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."

B. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Subcontractor or to Installer engaged by Subcontractor does not in itself confer qualification on buyer.

C. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Coordinate with work specified in other sections to determine location, extent and configuration of penetrations, including Work in specification sections in Division 21 Fire Suppression, Division 22 Plumbing, Division 23 Heating, Ventilating, and Air Conditioning, Division 26 Electrical, Division 27 Communications and Division 28 Electronic Safety and Security. The General Contractor and each Filed sub-bid contractor is responsible for the penetration fire stopping of their respective scope of work.

D. The Installing contractor is responsible to have at least 10% of each type of penetration tested and inspected by an independent testing agency. Testing reports shall be submitted to the Architect for record.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

    a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.

        1) UL in its "Fire Resistance Directory."

        2) Intertek Group in its "Directory of Listed Building Products."

        3) FM Global in its "Building Materials Approval Guide."

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hilti, Inc.
2. Specified Technologies Inc.
3. 3M Fire Protection Products.

2.3 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Furnish penetration firestopping for penetrations by work of each trade, including mechanical, plumbing, fire-protection, electrical work, and communications cabling.
2. Provide penetration firestopping for holes and openings in fire-resistance rated partitions, walls and ceilings that have no penetrations.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls, and fire partitions.
2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Horizontal assemblies include floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.

2. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
3. 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.

D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
   1. L-Rating: Not exceeding 5.0 cfm/square feet of penetration opening at 0.30-inch wg at both ambient and elevated temperatures.

E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

F. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.

1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

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 manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:

   a. Slag-wool-fiber or rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.
   d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.4 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.5 MIXING

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

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

C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. Provide firestopping at each penetration and hole in floors and in fire-rated wall and partition assemblies. Provide firestopping in other locations where indicated.

B. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

D. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify penetration firestopping with stencils, preprinted metal, or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be

visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

B. The installing contractor is responsible to apply the identification. Firestopping work will not be considered complete or acceptable until the labeling is complete.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections.

B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes joint sealants for the following applications:
   1. Interior control joints.
   2. Interior joints at changes of materials.
   3. Joint assembly accessories.

1.3 ACTION SUBMITTALS

A. Initial Submittal: Within 30 days of award the subcontractor must submit a complete list of all the materials including manufacturers, and model numbers where applicable, and lead times to be used to allow for timely delivery of materials.

B. Product Data: For each joint-sealant products and accessories indicated.

C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

E. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant color.

F. Qualification Data: For qualified Installer and testing agency.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

B. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a quali-

fied testing agency, indicating that sealants comply with requirements.

D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion Test Reports: For each sealant application tested.

G. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Manufacturers' special warranties.

B. Installer's special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.
   1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
   2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section. Refer to Section 01 43 39 "Mockups" for additional information.

E. Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

   1. When ambient and substrate temperature conditions are outside limits permitted by joint- sealant manufacturer or are below 40 deg F.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Manufacturers' warranties: Standard manufacturers' warranties for each product used.

B. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

C. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

D. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from natural causes exceeding design specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content: Sealants and sealant primers shall comply with the following:

   1. Architectural sealants shall have a VOC content of 250 g/L or less.
   2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
   3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.
   4. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of

5. Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT; and complying with SWRI's Sealant Validation Program.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Tremco Incorporated; Spectrem 3.
b. Dow Corning Corporation; 791 or 795.
c. May National Associates, Inc.; Bondaflex Sil 295.
d. Pecora Corporation; 864 or 895.

B. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
a. BASF Building Systems; Omniplus.
b. Dow Corning Corporation; 786 Mildew Resistant.
c. GE Advanced Materials - Silicones; Sanitary SCS1700.
d. May National Associates, Inc.; Bondaflex Sil 100 WF.
e. Tremco Incorporated; Tremsil 200 Sanitary.

2.4 URETHANE JOINT SEALANTS

A. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Corporation-Construction Systems; MasterSeal NP 2 (formerly Sonolastic NP2).
b. Pecora Corporation; Dynatrol II.
c. Sherwin Williams; Loxon 2K NS.
d. Tremco; Dymeric 240 FC.

B. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type M, Grade P, Class 25, for Use T and I.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. BASF Corporation-Construction Systems; MasterSeal SL 2 (formerly Sonolastic SL2).
    b. Pecora Corporation; Dynatrol II-SG.
    c. Sherwin Williams; Loxon 2K SL.
    d. Tremco; THC-900.

2.5 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
    1. Products: Subject to compliance with requirements, provide one of the following:

        a. BASF Building Systems; Sonolac.
        b. May National Associates, Inc.; Bondaflex Sil-A 700.
        c. Pecora Corporation; AC-20+ Silicone.
        d. Tremco Incorporated; Tremflex 834.

2.6 NONSTAINING SILICONE JOINT SEALANTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    1. Adfast.
    2. Pecora Corporation.
    3. Sika Corporation - Building Components.
    4. Tremco Incorporated.

B. Urethane Joint Sealant: Single component, nonsag, traffic grade, at traffic and non-traffic locations.

C. Silicone Joint Sealant neutral curing.

D. Silicone Mildew resistant, acid curing.

E. Latex joint sealant: Interior joints in surfaces to be painted.

F. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.

G. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        a. Adfast.
        b. Pecora Corporation.
        c. Sika Corporation - Building Components.

d. Tremco Incorporated.

H. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. GE Construction Sealants; Momentive Performance Materials Inc.
b. Pecora Corporation.
c. Sika Corporation - Building Components.
d. The Dow Chemical Company.
e. Tremco Incorporated.

2.7 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Adfast.
b. Construction Foam Products; a division of Nomaco, Inc.
c. Master Builders Solutions, brand of MBCC Group, a Sika company.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.
4. Provide flush joint profile at locations indicated on Drawings in accordance with Figure 8B in ASTM C1193.
5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings in accordance with Figure 8C in ASTM C1193.
    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests and Inspections:

1. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

C. Extent of Testing: Test completed and cured sealant joints as follows:

1) Perform 10 tests for the first 1000 ft. of joint length for each kind of sealant and joint substrate.
2) Perform one test for each 1000 ft. of joint length thereafter or one test per each floor per elevation.

D. Test Method: Test joint sealants in accordance with Method A, Tail Procedure, in ASTM C1521.

1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

b. Inspect tested joints and report on the following:

1) Whether sealants filled joint cavities and are free of voids.
2) Whether sealant dimensions and configurations comply with specified requirements.
3) Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

c. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
d. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

2. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

E. Prepare test and inspection reports.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage

or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Urethane Joint Sealant: Single component, nonsag, traffic grade, at traffic and non-traffic locations:
   1. Joints in cast-in-place concrete slabs.
   2. Joints in stone paving units, including steps.
   3. Tile flooring control and expansion joints.
   4. Perimeter joints between interior wall surfaces, aluminum- framed entrances and storefronts, and curtainwall.
   5. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
   6. Joints between stair stringer and stairway walls.

B. Silicone Joint Sealant neutral curing:
   1. Construction joints in cast-in-place concrete.
   2. Control and expansion joints in unit masonry.
   3. Perimeter joints between materials listed above and frames of doors, windows and louvers.
   4. Perimeter joints between materials listed above and aluminum-framed entrances and storefront, and aluminum curtainwall.
   5. Cast stone masonry trim units.

C. Silicone Mildew resistant, acid curing:

   1. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   2. Joints between countertops and wall surfaces.
   3. Perimeter joints at all edges of solid surface window stools.
   4. In walk-in cooler and freezer, joint between top of tile base and metal wall
   5. Tile control and expansion joints where indicated.

D. Latex joint sealant: Interior joints in surfaces to be painted.
   1. Vertical joints on exposed surfaces of interior gypsum board partitions.
   2. Joints between masonry veneer and gypsum board partitions.
   3. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
   4. Joints between casework and wall surfaces.

END OF SECTION

SECTION 08 1113

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Hollow metal doors and frames.
   a. Interior doors, door frames, and borrowed light frames to be primed.
   b. Hollow metal doors with factory installed glazing, primed or primed and galvanized.

B. Products furnished but not installed under this Section include the following:

1. Furnish glazing stops, for field installed side lights and borrowed lights, to Glass and Glazing Sub Contractor to use to install glazing, see Division 08 “Glazing.”

C. Related Sections:

1. Division 01 Section "Sustainable Design Requirements" for additional NE-CHPS documentation and requirements.
2. Division 01 Section "General Conditions".
3. Division 01 Section "Closeout Procedures".
4. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
5. Division 08 Section “Flush Wood Doors”.
6. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
7. Division 08 Section "Door Hardware".
8. Division 26 Sections for electrical connections including conduit and wiring for door controls and operators.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

B. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 867.

1.4 ACTION SUBMITTALS

A. Initial Submittal: Within 30 days of award the subcontractor must submit a complete list of all the materials including manufacturers, and model numbers where applicable, and lead times to be used to allow for timely delivery of materials.

B. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

C. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches
2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:

a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow metal panels and glazing if applicable.

F. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

A. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

B. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with construction requirements for tested and labeled fire-rated door assemblies except for size.
2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

C. 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 light.

D. Smoke and Draft Control Door Assemblies: Doors complying with NFPA 105 that are listed and labeled by a qualified testing agency, for smoke-control, based on testing according to UL 1784.

E. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal 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-inch-high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. de La Fontaine Industries.
2. Pioneer Industries, Inc.

3. Republic Doors and Frames.
4. Steelcraft; an Allegion company.
5. Fleming Door; an Assa Abloy Group Company.
6. Curries; an Assa Abloy Group Company.
7. CecoDoor; an Assa Abloy Group Company

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and 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.

C. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.

2.3 MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: 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. density; with maximum

flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Section 088000 "Glazing." and Section 088013 "Interior Glazing" for glazing types to be factory furnished and installed in hollow metal doors.

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.4 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Standard-Duty Doors and Frames: ANSI/SDI A250.8, Level 1; ANSI/SDI A250.4, Level C. At locations indicated in the Door and Frame Schedule on Drawings.

1. Doors:
   a. Type: As indicated in the Door and Frame Schedule on Drawings.
   b. Thickness: 1-3/4 inches .
   c. Face: Uncoated steel sheet, minimum thickness of 0.032 inch.
   d. Edge Construction: Model 2, Seamless.
   e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
   f. Core: Manufacturer's standard .
   g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors.
2. Frames:
   a. Materials: Uncoated steel sheet, minimum thickness of 0.042 inch.
   b. Construction: Full profile welded.
3. Exposed Finish: Prime .

2.5 FRAME ANCHORS

A. Jamb Anchors:
1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick.

2.6 HOLLOW METAL PANELS

A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

2.7 STOPS AND MOLDINGS

A. Moldings for Glazed Lights in Doors: Factory furnished and installed, minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.

C. Loose Stops for Glazed Lights in Frames: Furnish loose stops to Glass and Glazing Sub Contractor, minimum 0.032 inch thick, fabricated from same material as frames. Installed in the field by Section 088013 “Interior Glazing.”

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch-wide steel.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.9 FABRICATION

A. 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. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM-HMMA 867.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Glazed Lights: Factory cut openings in doors.
3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: 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.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. Sidelight Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
    a. Corridor Doors: Fabricate sidelight frames to be glazed from corridor side of frame.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Fire ratings may require additional anchors. Provide number and spacing of anchors as follows:
    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

1) Two anchors per jamb up to 60 inches high.
2) Three anchors per jamb from 60 to 90 inches high.
3) Four anchors per jamb from 90 to 120 inches high.
4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
1) Three anchors per jamb up to 60 inches high.
2) Four anchors per jamb from 60 to 90 inches high.
3) Five anchors per jamb from 90 to 96 inches high.
4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
5) Two anchors per head for frames above 42 inches wide and mounted in metal-stud partitions.

c. Post-installed Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

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

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Section 087100 "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/NAAMM-HMMA 867.
2. Reinforce doors and frames to receive non-templated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and 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.

G. Stops and Moldings: Furnish stops and moldings around glazed lights where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lights: Furnish fixed stops and moldings welded on secure side of hollow metal work.
2. Multiple Glazed Lights: Furnish fixed and removable stops and moldings so that each glazed light is capable of being removed independently.
3. Furnish removable stops and moldings on corridor side of hollow metal frames, to allow for mounting of room signs on glazing, in accordance with accessibility requirements.
4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.10 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

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.

2. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Mica Fluoropolymer: AAMA 621. Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set,.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with NAAMM/HMMA 840 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. 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.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer.

END OF SECTION

SECTION 08 3300

SMOKE AND FIRE CURTAINS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Automatic smoke curtains.

1.2 REFERENCES

A. Underwriters Laboratories (UL):
   1. UL 10D - Standard for Fire Tests of Fire Protective Curtain Assemblies.
   2. ANSI/UL 1784 – Air Leakage Tests of Door Assemblies

1.3 SUBMITTALS

A. Submit under provisions of Section 01 3000 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Test reports.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods:
      a. Instructions for resetting the latch with each unit.

C. Shop Drawings: Include system components, utility requirements and connections, relationship with adjacent construction. Include required clearances and access for servicing.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 years experience manufacturing similar equipment.

B. Installer Qualifications: Minimum 2 years experience installing similar equipment.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products indoors in secure locker manufacturer's unopened packaging. Minimize movement until ready for installation. Delicate aluminum and electronic components can be damaged easily and should be handled with extreme care.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 WARRANTY

A. Manufacture's standard limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Colt International GmbH, distributed by Fire Curtain Technologies

B. Coopers; SmokeStop EvacU8 .

2.2 AUTOMATIC SMOKE CURTAINS

A. Basis of Design: SD Automatic Smoke Curtains by the Colt Group, and distributed by Fire Curtain Technologies.
   1. Electrically operated automatic smoke curtain, seals off an area on fire alarm, preventing smoke from spreading. The curtain gravity-falls in controlled manner from ceiling to floor for smoke containment.
   2. Performance Characteristics:
      a. Tested and in compliance with UL10D; additionally investigated to ANSI/UL 1784 for one and three hour ratings.
      b. Successful continuous performance test of 10,000 cycles
   3. Dimensions and Size Range: Provide size suitable for project requirements; refer to the Drawings.
   4. Curtain Type:
      a. Single Unit (type SI).
         1) Width: Up to 177 in (4500mm)
         2) Drop: Up to 236 in (6000mm).
   5. Bottom Bar Type: DP bottom bar (fabric loop).
   6. Fire Rating
      a. Smoke Rating: up to 1 hour, UL 10D/1784.
   7. Control Type: Control panel with integrated microprocessor designed to operate automatic smoke- or fire curtains in a safe and correct manner. The control panel shall be prepared for connection to a fire alarm system and designed to enable the implementation of additional operational functions. Options a, b, c, d.
      a. Power supply for 24V DC output for direct connection to the fire alarm system.
      b. Control panel can be wired to allow multiple curtains to operate as an integrated part of a smoke control and fire management system.
      c. An uninterruptible power supply (UPS) may be supplied and connected so that in event of power failure, the curtain remains retracted for a predetermined period (nominally 30 minutes). If signaled to descend during this time, the smoke curtain shall drop in a controlled manner to its fire operational position in a fail-safe manner.
      d. A key switch for manual operation can be connected to an uninterruptible power supply to maintain the curtains in their raised positions in the event of a main power outage.
   8. Fabrication:
      a. Fabricate frames to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints. Assemble units in factory to minimize field splicing and assembly.
      b. Disassemble units as necessary for shipping and handling limitations.
      c. Clearly mark units for reassembly and coordinated installation.
      d. Include anchors and accessories required for complete assembly.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates and openings have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions. Test for proper operation.

3.4 PROTECTION

A. After installation, clean as recommended by the manufacturer.

B. Remove and legally dispose of construction debris from project site.

C. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 7100

DOOR HARDWARE

PART 1- GENERAL

1.1 SUMMARY

A. Section Includes: Door hardware for wood doors, steel doors, aluminum framed entrance doors, all glass entrance doors, and miscellaneous hardware items.

B. Provide hardware not described herein but otherwise required for proper completion of the project, conforming to size, function, quality, and finish of other specified hardware.

1.2 RELATED SECTIONS

A. Division 6: Rough Carpentry.

B. Division 8: Aluminum Doors and Frames

C. Division 8: Hollow Metal Doors and Frames.

D. Division 8: Wood Doors.

E. Division 26 Electrical

F. Division 28: Electronic Security

1.3 REFERENCED STANDARDS

A. American National Standards Institute (ANSI):
   1. ANSI A117.1 Accessible and Usable Buildings and Facilities.

B. Builders Hardware Manufacturers Association (BHMA):
   1. ANSI/BHMA A156.1 Butts and Hinges.
   2. ANSI/BHMA A156.2 Bored and Preassembled Locks and Latches.
   3. ANSI/BHMA A156.3 Exit Devices.
   4. ANSI/BHMA A156.4 Door Controls - Closers.
   5. ANSI/BHMA A156.5 Auxiliary Locks and Associated Products.
   6. ANSI/BHMA A156.6 Architectural Door Trim.
   7. ANSI/BHMA A156.7 Template Hinge Dimensions.
   8. ANSI/BHMA A156.8 Door Controls - Overhead Stops and Holders.
   9. ANSI/BHMA A156.10 Power Operated Pedestrian Doors.
   10. ANSI/BHMA A156.13 Mortise Locks and Latches.
   11. ANSI/BHMA A156.14 Sliding and Folding Door Hardware.
   12. ANSI/BHMA A156.15 Release Devices: Closer Holders, Electromagnetic and Electromechanical.
   13. ANSI/BHMA A156.16 Auxiliary Hardware.
   14. ANSI/BHMA A156.17 Self-Closing Hinges and Pivots.
   15. ANSI/BHMA A156.18 Materials & Finishes.
   16. ANSI/BHMA A156.19 Power Assist & Low Energy Power Operated Doors.
   17. ANSI/BHMA A156.21 Thresholds.
   18. ANSI/BHMA A156.22 Door Gasketing and Edge Seal Systems.
   19. ANSI/BHMA A156.23 Electromagnetic Locks.
   20. ANSI/BHMA A156.24 Delayed Egress Locks.

21. ANSI/BHMA A156.25 Electrified Locking Devices.
22. ANSI/BHMA A156.26 Continuous Hinges.
23. ANSI/BHMA A156.28 Recommended Practices for Mechanical Keying Systems.
24. ANSI/BHMA A156.29 Exit Locks, Exit Locks with Exit Alarms, Exit Alarms, Alarms for Exit.
25. ANSI/BHMA A156.30 High Security Cylinders.
26. ANSI/BHMA A156.31 Electrified Strikes and Frame Mounted Activators.
27. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors with Steel Frames.
28. ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames.

C. Door and Hardware Institute (DHI):
1. ANSI/DHI A115.IG Installation Guide for Doors and Hardware
2. DHI Keying Systems and Nomenclature
3. DHI Sequence and Format for the Hardware Schedule

D. International Building Code (IBC)

E. National Fire Protection Association (NFPA):
1. NFPA 80 Fire Doors and Fire Windows
2. NFPA 252 Fire Tests of Door Assemblies

F. Underwriters Laboratories Inc. (UL):
1. UL 10C Positive Pressure Fire Tests Of Door Assemblies
2. UL 305 Panic Hardware
3. UL 437 Drill and Pick Resistant Key Cylinders
4. UL 1034 Burglary-Resistant Electric Locking Mechanisms

1.4 SUBMITTALS

A. Products other than those designated herein must be approved as substitutions prior to submittal of Door Hardware.

B. Door Hardware Schedule: Vertical format conforming to DHI “Sequence and Format for the Hardware Schedule.” Horizontal format schedules will be rejected without review. Format shall be 8-1/2 by 11 inch page size. Organize Schedule into headings, grouping doors to receive same hardware items, indicating quantity and complete designations of every item required for each door opening.

C. Schedule shall be submitted in searchable digital file format.

D. The schedule shall include:
1. Cover sheet indicating name and location of Project; name of Architect; name of Contractor; name, address and phone of hardware supplier, name of hardware consultant preparing the schedule; date of submittal or revised submittal.
2. A list of abbreviations used in schedule.
3. An index of door openings, listed in numerical order, with hardware heading identification cross-referenced to Architect’s set identification.
4. Hardware headings shall be listed in numerical order corresponding, as closely as possible, with numerical order of Architect's set numbers.
5. Each hardware heading shall have each door listed in numerical order according to door numbers in the Architect's door schedule, and denoting: location, configuration (single, pair, etc.), type (elevation, etc.), door and frame size(s), door and frame material(s), handing, fire rating, and key set identification.
6. Type, complete model number, style, function, size, hand, and finish of each door hardware item.

7. Manufacturer of each item.
8. Fastenings and other pertinent information.

E. Manufacturer's Technical Product Data / Catalog Cut Sheets: Clearly marked for each hardware item, including installation details, material descriptions, dimensions of individual components and profiles, and finishes. Format shall be 8-1/2 by 11 inch page size.

F. Wiring Diagrams: No later than 14 days after receipt of reviewed hardware schedule submittal, submit detailed wiring diagrams for power, signaling, monitoring, and control of the access control system electrified hardware or other system electrified components such as sensors, switches, or indicator/ strobe lights; identified by door number(s), and detailed specifically for each type and function of electrified door opening. Format shall be 8-1/2 by 11 inch page size. Include the following:
1. System Description of Operation. Include description of component functions including, but not limited to, the following situations: normal secured/unsecured state of door; authorized access; authorized egress; unauthorized access; unauthorized egress; fire alarm and loss of power conditions, and interfaces with other building control systems.
2. Elevation single-line diagram, showing interface between electrified door hardware and fire alarm, power, access control, and security systems as applicable.
3. Point-to-point wiring diagram for field-installed wiring.

G. Keying Schedule: In accordance with Owner's final keying instructions for locks. Conform to DHI “Keying Systems and Nomenclature.” Format shall be 8-1/2 by 11 inch page size.

H. Operation and Maintenance Data: Provide complete operating and maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides.

I. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

J. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

B. Manufacturers, Hardware Supplier, and Installer shall have no less than five years’ experience in the provision of Door Hardware for projects similar in size, complexity and type to this Project.

C. Hardware Schedule and Keying Schedule submittals shall be prepared by a Hardware Consultant holding the credentials of Architectural Hardware Consultant (AHC) issued by the Door and Hardware Institute. Hardware Consultant shall have no less than five years’ experience in the scheduling of Door Hardware for projects similar in size, complexity and type to this Project; and shall be available, at no additional cost, during the course of the Work to consult with Contractor, Architect, and Owner regarding door hardware and keying.

1.6 REGULATORY REQUIREMENTS

A. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with all applicable regulations, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. At rated doors with panic exit devices, provide devices labeled as “Fire Exit Device.”

B. Comply with all applicable accessibility regulations as set forth in the 2010 ADA Standards.

C. Latching and locking doors that are hand-activated and that are in a path of travel shall be operable with a single effort by lever-type hardware, panic bars, push-pull activating bars, or other hardware designed to be easy to grasp with one hand, not requiring tight grasping, tight pinching or twisting of the wrist; from egress side shall not require the use of a key, tool, or special knowledge for operation.

1. All hand-activated hardware shall be mounted between 34 inches and 48 inches above finished floor.

D. At sliding and pocket doors, when fully open, operating hardware shall be exposed and usable from both sides.

E. Door closing devices shall comply with the following maximum opening-force requirements:

1. Interior Hinged Doors: 5 lbf applied perpendicular to door at latch.
2. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
3. Fire Rated Doors: 5 lbf applied perpendicular to door at latch. To ensure latching, may be increased to the minimum force allowable by the appropriate administrative authority, not to exceed 15 lbf.

F. Thresholds shall be maximum 1/2 inch in height above floor and landing on both sides of openings. Bevel raised thresholds with a slope of not more than 1:2.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Each article of hardware shall be delivered individually packaged in the manufacturer's standard commercial carton or container, and shall be properly marked or labeled to be readily identifiable with the approved hardware schedule.

B. Manufacturer's printed installation instructions, fasteners, and special tools shall be included in each package.

C. Hardware shall be stored in a dry, secure locked area, complete with shelving for unpacking and sorting of the door hardware.

D. Deliver all master keys by restricted, receipted delivery directly from the manufacturer to the Owner.

1.8 COORDINATION

A. Provide hardware templates to the parties involved for doors, frames, and other work specified to be factory prepared for door hardware. Check Shop Drawings of other work

to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. When required by door or frame fabricator, furnish physical samples of each mortised and recessed hardware item required.

C. Coordinate layout and installation of recessed pivots and closers with floor construction.

D. Electrical System Rough-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, and security system as applicable.

E. Pre-Installation Conference: Arrange conference at job site to coordinate door, frame, hardware and electronic security hardware installation; to be attended by the Architect, Owner, Contractor and representative personnel of firms involved in the provision and installation of said items.

F. Keying Conference: Arrange conference with Owner, or designated representative, and Manufacturer's/ Hardware Supplier's Architectural Hardware Consultant to establish keying requirements. Incorporate keying conference decisions into Keying Schedule.

1.9 WARRANTY

A. In addition to, and not precluding, other warranty requirements in the Contract Documents, the following hardware items shall carry extended minimum warranties as indicated:
   1. Hinges: Ten years from date of Substantial Completion.
   2. Locks: Five years from date of Substantial Completion.
   3. Exit Devices: Three years from date of Substantial Completion.
   4. Door Closers: Ten years from date of Substantial Completion.

1.10 MAINTENANCE

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

PART 2- PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements herein, provide products by one of the following manufacturers for each type of hardware:
   1. Butt Hinges: Hager, Ives, McKinney, BEST.
   2. Cam Lift Hinges: ABH, McKinney, Zero.
   3. Continuous Pinned Hinges: Architectural Builders Hardware, Hager, Markar, Select.
   4. Continuous Geared Hinges: Architectural Builders Hardware, Hager, National Guard Products, Pemko, Select.
   5. Concealed/Invisible Hinge: Tectus, McKinney, RocYork, Soss.
   6. Pivots: Architectural Builders Hardware, dormakaba, Ives, Rixson.
   7. Cylinders and Keying: Schlage Everest
   8. Locksets and Latchsets: Corbin Russwin, Sargent, Schlage.
   9. Exit Devices: Basis of Design: Von Duprin 98 Series or Corbin Russwin ED4000/ED5000, Precision Apex 2000 Series, Sargent 80 Series.
   10. Electric Strikes: Folger Adam, Hanchett Entry Systems (HES), Rutherford Controls Intl. (RCI), Von Duprin.

11. Electrical Power Transfers: Architectural Builders Hardware, Securitron, Von Duprin.
12. Locking Ladder Pulls: ABH, Rockwood, CRL.
13. Flush Bolts and Door Coordinators: Architectural Builders Hardware, Ives, Rockwood, Trimco.
14. Surface Door Closers: Basis of Design: LCN 4040XP or Corbin Russwin DC8000, Sargent 351 Series, or Norton 7500 Series..
15. Overhead Holders and Stops: Architectural Builders Hardware RA Series, Glynn-Johnson, Rixson.
16. Overhead Surface and Concealed Automatic / Low Energy Door Operators: Allegion, Assa Abloy Entrance Systems, Horton, Motion Access, Norton, Stanley.
17. Automatic Door Actuators: BEA, Besam, Horton, Motion Access, Norton.
18. Bollards: BEA, Norton, Wikk.
19. Electromagnetic Holder / Releases: Architectural Builders Hardware, LCN, Rixson, Security Door Controls.
20. Architectural Door Trim: Architectural Builders Hardware, Ives, Rockwood, Trimco.
21. Auxiliary Hardware: Ives, Rockwood, Trimco.
22. Door Bottoms, Metal Thresholds, Weatherstripping and Gaskets: National Guard Products, Pemko, Zero.
23. Pocket, Folding and Sliding Door Hardware: Cavity Sliders, KN Crowder, Pemko.
24. Key Storage System: Lund, MMF Industries, Telkee.

2.2 MATERIALS AND FABRICATION

A. Requirements for grade, materials, size, and other distinctive qualities of each type of door hardware are indicated herein. Furnish items in types, sizes or weight, in accordance with manufacturer's standards, appropriate for the conditions of installation and service, unless otherwise indicated.

B. Products named or identified by make or model number, or other designation and described herein are base products. Base products establish the standards of type, in-service performance, physical properties, appearance, warranty, cost, and other characteristics required by the Project.

2.3 FASTENERS

A. Provide concealed fasteners for hardware items on exterior doors which are exposed when door is closed.

B. Combination machine screws and expansion shields shall be used for attaching hardware to concrete or masonry.

C. Fasteners exposed to the weather in the finished work shall be of brass, bronze, or stainless steel.

2.4 BUTT HINGES

A. Butt hinges shall meet the requirements of ANSI/BHMA A156.1.

B. Hinge dimensions shall meet the requirements of ANSI/BHMA A156.7.

C. Base Metal shall be steel plated for fire-rated doors; bronze or stainless steel for exterior out swinging doors; bronze or plated steel elsewhere as scheduled.

D. Provide hinges with antifriction bearings for doors with closers.

E. Unless otherwise indicated, provide hinges in heights and weights as follows:
1. Doors to 36 inches wide: 4-1/2 inches Standard Weight.
2. Doors over 36 inches to 48 inches wide: 5 inches Heavy Weight.
3. Doors over 48 inches wide: 6 inches Heavy Weight.
4. Doors over 1-3/4 inch thick shall be per hinge manufacturers published listings or recommendations.

F. Provide in minimum width sufficient to clear trim when door swings 180 degrees, whether or not shown on Drawings to swing 180 degrees.

G. Number of hinges per leaf shall be as follows:
1. Doors to 60 inches in height: 2 hinges.
2. Doors over 60 to 90 inches in height: 3 hinges.
3. Doors over 90 to 120 inches in height: 4 hinges.
4. For doors over 120 inches in height: 4 hinges plus 1 hinge for every 30 inches, or fraction thereof, door height greater than 120 inches.

H. Screws: Flat head wood screws not less than 1-1/2 inches long for hinges for wood doors; flat head machine screws elsewhere.

I. Hinges reverse bevel doors with key locks shall have pins that are made non-removable [NRP] when the door is in the closed position by means of a set screw in the hinge pin barrel. Where passage or privacy sets, push/pulls openings are specified, non-removable pins are not required.

J. Electrified hinges:
1. Coordinate number and size of wires for electrified hardware served.
2. Provide junction box/ mortar shield for each electrified hinge.
3. All electric hinges to have quick connector-type connectors.

2.5 CONTINUOUS PINNED HINGES

A. Continuous hinges shall meet ANSI/BHMA A156.26 requirements.

B. Type: Pin and barrel construction; 1/4 inch diameter stainless steel pin; split nylon or stainless steel bearings. Fabricated from 14 gauge cold-rolled steel or 304 stainless steel as indicated.

C. Provide in minimum width sufficient to clear trim when door swings 180 degrees, whether or not shown on Drawings to swing 180 degrees.

D. Hole pattern for fasteners shall be symmetrical and located to template dimensions.

E. All electric hinges to have quick connector-type connectors.

2.6 CONTINUOUS GEARED HINGES

A. Continuous hinges shall meet ANSI/BHMA A156.26 requirements.

B. Type: Heavy duty assembly of 3 interlocking aluminum extrusions. Door leaf and jamb leaf shall be continuously geared together the full hinge length; secured together with full length cover channel permitting 180 degree operation. Vertical door loads carried on integrated thrust bearings spaced no more than 3 inches apart.

C. Hinges shall have non-removable cap at hinge top to prevent foreign material from becoming lodged in hinge gear mechanism.

D. Unless otherwise noted, provide factory finished to match door and frame finish.

E. Hole pattern for fasteners shall be symmetrical and located to template dimensions.

F. All electric hinges to have quick connector-type connectors.

2.7 CYLINDERS, KEYING AND KEY STORAGE

A. Lock cylinders shall meet ANSI/BHMA A156.5 requirements.

B. Keying system shall meet ANSI/BHMA A156.28 requirements.

C. All cylinders shall be interchangeable core type.

D. Cylinders at exit devices shall be interchangeable core type. Provide mortise or rim type cylinders as required by device for all exit devices having key locking function.

E. Keying shall be provided per the Owner's requirements.

F. Cylinders shall be keyed according to approved Keying Schedule.

G. Provide a temporary keying system for interim use during construction.

H. Provide change keys in individual envelopes for each cylinder delivered. Envelopes shall be marked with respective door identification numbers.

I. Key set symbol, and inscription "Do Not Duplicate" shall be stamped on all keys.

J. Key set symbol shall be concealed stamped on all cylinders/ removable/ Interchangeable cores.

K. Keys shall be supplied as follows:
1. Locks: 2 change keys each lock.
2. Master keyed sets: 2 keys each set.
3. Grand master keys: 5 total.
4. Great Grand master keys: 5 total.
5. Interchangeable Core control keys: 2 total.
6. Construction keys: 10 total.
7. Blank keys: 100 total.

2.8 LOCKSETS AND LATCHSETS

A. Mortise Locks and Latches shall meet ANSI/BHMA A156.13 Grade 1 requirements.

B. Auxiliary Locks shall meet ANSI/BHMA A156.5 requirements.

C. Electrified Locks shall also meet ANSI/BHMA A156.25 requirements.

D. Operating trim shall be lever type: Refer to hardware sets.

E. Lock functions which include thumb turn trim shall be provided with thumb turns compliant with accessibility code requirements.

F. Lock Throw: Comply with requirements for length of latch bolts to comply with labeled fire door requirements.

G. Lock backset shall be 2-3/4 inches unless otherwise indicated.

H. Electromechanical locksets utilized at fire rated openings shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction, and shall maintain door in positive latched position when power is off.

I. Narrow backset locksets to be used when standard width/ backset devices do not fit door stile.

J. Provide occupancy indicator at all cylindrical and mortise privacy sets. Architect to select if wording to be Unlocked/Locked or Vacant/Occupied. Indicator shall be at each side of door. Example, Sargent V11/V21.

K. All electric locks to have quick connector-type connectors.

2.9 EXIT DEVICES

A. Exit devices and exit device accessories shall meet ANSI/BHMA A156.3, Grade 1 requirements.

B. Electromechanical exit devices shall also meet ANSI/BHMA A156.25 requirements.

C. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

D. Fire Exit Devices: Complying with 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.

E. Outside Trim: Design, material and finish to match locksets, unless otherwise indicated.

F. Adjustable strikes shall be provided for rim type and vertical rod devices.

G. Fire Exit Removable Mullions: Where indicated, provide removable mullions for use with fire exit devices complying with 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. Mullions shall be used only with exit devices for which they have been tested.

H. Electromechanical exit devices utilized at fire rated openings shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction, and shall maintain door(s) in positive latched position when power is off.

I. Narrow backset devices shall be provided to match specified device when standard width chassis/ devices do not fit door stile.

J. Provide flush end caps at exit devices.

K. Provide device for proper door thickness.

L. Weatherized exit device:
   1. Areas where hardware is prone to corrosion provide powder coated metal finish.

M. At locations where exit devices are being used in a Pool/Aquatic area, provide 628 or powder coated metal finish.

N. All electric exit devices to have quick connector-type connectors.

2.10 MULLIONS

A. Extruded Aluminum Removable Mullions: ANSI/BHMA A156.3 anodized, removable mullions with malleable-iron top and bottom retainers. Mullions to be provided standard with stabilizers and imbedded weatherstrip.
   1. Manufacturers: Same as exit device manufacturer.

B. Steel Removable Mullions: ANSI/BHMA A156.3 steel removable mullions with options for fire rating, locking, through-wire electrification and hurricane compliance as specified.
   1. Provide mullions with functions and features as follows:
      a. At openings designed for severe wind load conditions due to hurricanes or tornadoes, provide manufacturer's certified mullion and accessories to meet applicable state and local windstorm codes.
      b. Provide keyed removable feature where specified in the Hardware Sets.
      c. Provide stabilizers and mounting brackets as required.
      d. Provide electrical quick connection wiring options as specified in the hardware sets.
      e. Manufacturers: Same as exit device manufacturer.

2.11 ELECTRIC STRIKES

A. Electric strikes shall meet ANSI/BHMA A156.31 Grade 1 requirements and be listed and labeled under UL 1034 Burglary Resistant Electric Locking Equipment.

B. Electric strikes for fire rated openings shall be listed and labeled for such use by a testing agency acceptable to authorities having jurisdiction. Fail Secure (fail locked) strikes shall be used at all fire rated openings.

C. All electric strikes to have quick connector-type connectors.

2.12 FLUSH BOLTS

A. Automatic flush bolts shall meet ANSI/BHMA A156.3

B. Manual flush bolts shall meet BHMA A156.16 requirements.
   1. Bottom bolt shall have 12 inch long operating rod. Top bolt operating rod shall be determined by door height, assuring the operator is located less than 72 inches above the floor.
   2. Manual Flush Bolts are not to be utilized except where a pair of non-rated doors serving a room not normally occupied is needed for the movement of equipment.

C. Provide dust proof strikes for bottom bolts. Dust proof strikes shall meet BHMA A156.16.

2.13 DOOR COORDINATORS

A. Door coordinators shall meet ANSI/BHMA A156.3 requirements.

B. Door coordinators shall be flat bar type; stop mounted with all necessary filler bars and mounting brackets to accommodate required hardware.

C. Provide carry bar at each pair of doors equipped with an overlapping astragal, except when automatic or self-latching bolts are used.

2.14 SURFACE DOOR CLOSERS

A. Door closing devices shall meet ANSI/BHMA A156.4, Grade 1 requirements.

B. Surface closers shall be fully adjustable with sweep speed, latch speed and back check position valves.

C. Provide closers size adjusted in accordance with ANSI/BHMA A156.4; sized as required to insure closing and latching of doors.

D. Arm selection shall follow the requirements of the manufacturer's recommendations with brackets, drop plates and miscellaneous accessories provided as necessary.

E. Provide closers with arms designed to permit openings of doors as far as job conditions will permit; unless otherwise indicated closers with arms restricting opening of door will not be acceptable.

2.15 ELECTROMAGNETIC HOLDER / RELEASES

A. Electromagnetic holders shall meet ANSI/BHMA A156.15 requirements.

B. Size and configuration shall provide degree of swing and hold open position as indicated on the drawings.

C. Coordinate length for attachment based on lever and locking device trim to wall.

2.16 ARCHITECTURAL DOOR TRIM

A. Architectural door trim shall meet ANSI/BHMA A156.6 requirements.

B. Door Protection Plates: Kick, mop, and armor plates shall be 0.050 inch thick brass, bronze, or stainless steel depending on finish indicated. Plates shall have beveled edges, and shall be provided with countersunk mounting holes and No. 6 oval head screw fasteners. Width of kick and armor plates shall be 2 inches less than door width for single doors and 1 inch less for pairs of doors. Width of mop plates shall be 1 inch less than door width.
   1. Kick Plates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
   2. Mop Plates: Provide with four beveled edges ANSI J103, 4 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
   3. Armor Plates: Provide ANSI J101 with four beveled edges, 30 inches high by width less 1 inch on single or pairs of doors. Furnish oval-head countersunk screws to match finish.
   4. At fire rated doors, provide UL labeled protection plates in sizes, types, fasteners and materials only in accordance with door manufacturer’s listings for respective ratings.
   5. Provide cutouts for hardware as listed in the hardware sets.

C. Door Edging and Astragals: Fabricated from 18 gauge cold-rolled steel or 304 stainless steel as indicated; factory prepared for all mortise hardware; countersunk screw mounting.
   1. At fire rated doors, provide UL labeled edge protection in sizes, types, fasteners and materials only in accordance with door manufacturer’s listings for respective ratings.

D. Push and pull plates shall be 0.050 inch thick brass, bronze, or stainless steel depending on finish indicated. Plates shall have beveled edges, and shall be furnished with

countersunk mounting holes and No. 6 oval head screw fasteners. Pull plates shall also be furnished with flat-head through bolts for pull grip.

E. Push and pull bars and grip handles shall be brass, bronze, or stainless steel depending on BHMA finish indicated.

2.17 AUXILIARY HARDWARE

A. Auxiliary hardware shall meet ANSI/BHMA A156.16 requirements.

B. A door stop shall be bid/provided at every door location, regardless if one is itemized in the heading/group.

C. Door Stops: Provide floor stop or wall bumper. Where it is not possible to properly place a floor or wall type stop, provide heavy duty overhead type stop, or when door closer is indicated on the push side of the door, provide heavy-duty dead stop function in closer.
   1. Stops shall be of heavy duty construction.
      a. Wall bumpers shall have no visible fasteners.
      b. Floor stops shall be of height required by floor conditions.
      c. At areas where ligature resistant is required, provide Kingsway Group KG182.
   2. Overhead Stops
      a. Overhead holders and stops shall meet ANSI/BHMA A156.8 requirements.
      b. Overhead door holders and stops shall be adjustable from 90 to 110 degrees dead stop or hold open position, as applicable.
      c. Overhead door stops shall have shock absorbers providing 5 to 7 degrees compression before dead stop.
      d. Overhead stops shall not be provided with hold open function when used at fire rated doors.
      e. Overhead stop to work with closer.

D. Silencers: Rubber, non-marring configured for metal or wood frames as scheduled. Provide quantity based on door size.

2.18 ELECTRICAL POWER TRANSFERS

A. Electrical power transfers shall be capable of transferring sufficient electrical current to properly operate electrified hardware in door.

B. Electrical power transfers used on fire rated doors shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

C. Verify and provide at all doors with Pivots.

D. At frames that are 1.5” or less or doors with swing clear hinges, provide Securitron EPT or ABH PT1000SC power transfer, or power transfer hinge.

E. Provide with quick connector.

F. Power over Ethernet transfer shall incorporate pin connector to match locking device.

2.19 ELECTRIFIED ACCESSORIES

A. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and

power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
   a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
   b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.
2. Manufacturers:
   a. Hager Companies (HA) - Quick Connect.
   b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – QC-C Series.
   c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – PoE Series.
   d. Allegion CON.
   e. dormakaba

B. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.

2.20 DOOR BOTTOMS

A. Door bottoms shall be of aluminum or extruded bronze of the type and finish indicated and shall provide proper clearance and an effective seal with specified thresholds.

B. Door bottom shall have a vinyl, neoprene, silicone rubber, polyurethane or brush seal as indicated.

C. The door bottom shall exclude light when the door is in the closed position and shall inhibit the flow of air through the unit.

2.21 METAL THRESHOLDS

A. Thresholds shall meet ANSI/BHMA A156.21 requirements.

B. Thresholds shall be heavy-gauge aluminum or bronze of the configuration and finish indicated, and shall provide an effective seal with door bottom.

C. Where required, thresholds shall be prepared to accommodate floor closers, pivots, and projecting bolts of latching hardware.

D. Thresholds at floor closers shall have mitered returns and removable access portion for floor closer maintenance.

E. Provide thresholds at doors where indicated. Refer to Door Schedule and Drawing details for type and configuration required. Additionally, where combustible flooring passes under doors, provide fire door thresholds in accordance with applicable regulatory requirements.

2.22 METAL HOUSED TYPE WEATHERSTRIP

A. Metal Housed Type Weatherstrip shall meet ANSI/BHMA A156.22 requirements.

B. Metal Housed Type Weatherstrip shall be aluminum or bronze of the type and finish indicated, comprised of metal retainers with vinyl, neoprene, silicone rubber, polyurethane or brush inserts as indicated.

2.23 GASKETING

A. Gasketing shall meet ANSI/BHMA A156.22 requirements.

B. Shall be a compression type product for use with wood or steel doors; labeled for use on smoke-control and fire-rated doors where required.

2.24 FINISHES

A. Provide hardware in finishes as indicated in hardware set or as noted below:

B. Aluminum Framed Entrance Hardware Finish to be determined.

C. Finish hardware at hollow metal and wood doors to be US26D/US32D.

D. Closers shall be Powder Coated

E. Adhesive Gasketing shall be Black.

F. Areas where hardware may be prone to corrosion, 32D-316 metal finish or Clear Powder Coat Finish.

G. Interior and Exterior Aluminum Framed Openings: Finish to be selected by Architect.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine doors and frames for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine rough-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Steel doors shall be factory prepared for hardware per ANSI/BHMA A156.115.

B. Wood doors shall be factory prepared for hardware per ANSI/BHMA A156.115W.

C. Installation shall be in accordance with DHI A115.IG.

D. Hardware for fire door assemblies shall be installed conforming with NFPA 80, and all other applicable building codes and regulations.

E. Hardware for smoke door assemblies shall be installed conforming with NFPA 105, and all other applicable building codes and regulations.

F. Install each door hardware item according to manufacturer's printed instructions, utilizing templates and proper fasteners provided by manufacturer.

G. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

H. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in other Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

I. Install each door hardware item to comply with manufacturer's written instructions. Install overhead surface closers for maximum degree of opening obtainable. Place on room side of corridor doors, stair side of stair doors, secondary corridor side of doors between corridors. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be finished, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

J. All wall stops shall be installed with reinforced blocking in wallboard construction. Drywall anchors are not an acceptable means of reinforcement/blocking. Provide intermediate steel plates or channel reinforcement backing at wall stops mounted in wallboard construction.

K. Do not install permanent key cylinders in locks until the time of preliminary acceptance by the Owner. At the time of preliminary acceptance, and in the presence of the Owner's representative, permanent key all lock cylinders. Record and file all keys in the key control system specified, and turn system over to Owner for sole possession and control.

L. Key control storage system shall be installed where directed by the Owner.

M. Thresholds shall be secured with a minimum of 3 fasteners per single door width and 6 fasteners per double door width with a maximum spacing of 12 inches; with a minimum of 1 inch thread engagement into the floor or anchoring device used. Thresholds over 6 inches in width shall be secured with a double row of fasteners.

N. Exterior thresholds shall be installed in a bed of sealant with combination expansion anchors and stainless steel machine screws, except that bronze or anodized bronze thresholds shall be installed with expansion anchors with brass screws.

3.3 CONTINUOUS HINGES

A. Prevent conflicts with other installed hardware mounted in the same location.

B. Coordinate continuous hinge lengths to prevent conflicts with other door hardware such as door sweeps and door bottoms. Door bottoms shall be installed full width of door to create a full seal.

3.4 DOOR CLOSING DEVICES

A. Surface closers on doors opening to or from halls and corridors shall be mounted on the room side of the door.

B. Surface closers on doors opening into stairs or stair vestibules shall be mounted on the stair or stair vestibule side of the door.

C. Surface closers on exterior doors shall be mounted on the interior side of building utilizing regular arm, or parallel arm mounting as required.

D. Door closing devices with adjustable spring power shall be adjusted for proper door operation, and compliance with all applicable codes and regulations.

E. Cutting of gasketing or weatherstripping to accommodate closer installation is not acceptable.

3.5 PUSH-PULL PLATES

A. Pull plate grip handles shall be through bolted through the door. When push plate is indicated on opposite door side, through bolts shall be countersunk with push plate mounted to conceal through bolts.

3.6 KEY CONTROL STORAGE SYSTEMS

A. Key control storage system shall be installed where directed by the Architect.

B. Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.

3.7 GASKETING/ WEATHERSTRIPPING

A. Prevent conflicts with other installed hardware mounted in the same location.

B. Coordinate door sweep and door bottom widths to prevent conflicts with other door hardware such as continuous hinges. Door bottoms shall be installed full width of door to create a full seal.

3.8 ASTRAGALS

A. Unless otherwise indicated install overlapping astragals as follows:
   1. At out-swing pairs of doors, mount astragal on active leaf.
   2. At in-swing pairs of doors, mount astragal on inactive leaf.

3.9 HARDWARE LOCATIONS

A. Unless otherwise indicated install hardware as follows or as local codes require:
   1. Bottom Hinge: 10 inches from door bottom to bottom of hinge.
   2. Top Hinge: 5 inches from door top to top of hinge.
   3. Center Hinge(s) or Pivot(s): Spaced equidistantly between top and bottom hinges/ pivots.
   4. Lockset / Latchset: 38 inches from finished floor to center of lever.
   5. Hospital Push-Pull Latchset/ Lockset: 42 inches from finished floor to center of latch.
   6. Exit Device: 38 inches from finished floor to device centerline.
   7. Deadlock: 42 inches from finished floor to center key cylinder / thumb turn.
   8. Push Plate/ Pull Plate: 42 inches from finished floor to center of pull.
   9. Wall Bumper: Centered at point on wall where lever, or other operating trim, first makes contact with wall.
   10. Floor Stop: Adjacent to wall; not to exceed 4 inches from face of wall; located 3 inches from latch edge of door; in any case never more than 50 percent of door width from latch edge of door.

3.10 ADJUSTING

A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended.

B. Engage a factory-authorized service representative to adjust door closing devices, compensating for final operation of heating and ventilating equipment, and to comply with referenced accessibility requirements.

C. Follow-up Adjustment: Approximately 6 months after date of Substantial Completion, Installer shall perform the following:
   1. Examine and readjust each item of door hardware as necessary to ensure function of door hardware.
   2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
   3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

D. Where door closers are provided, adjust sweep speed so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum.

3.11 COMPLETION

A. When complete all hardware shall be properly secured in place and all exposed surfaces shall be clean and free from scratches, paint, and other defects and damages.

B. Contractor shall demonstrate that all keys properly operate the locks as identified in the approved Keying Schedule.

3.12 DOOR HARDWARE SETS

A. The following is a general listing of hardware requirements. Provide hardware items required by established standards and practices to meet state and local codes, whether or not specifically indicated in the following sets.

B. Silencers and gasketing, where listed in Hardware Sets, may be omitted at openings where door frames are provided with integral seals if integral seals satisfy all applicable Codes and Regulations.

C. Refer to Door Schedule and/ or Drawings for door opening information, hardware set assignment, and related requirements.

D. Door contacts where indicated on security drawings.

E. Access Control Reader where indicated on security drawings.

F. Provide spacer, blade stop, drop plate as required for door closers.

G. At aluminum openings, coordinate gasketing, and/or astragal with Aluminum Entrances and Storefronts Section.

Set: 1.0

Description: Paired Opening - Stairwell

2	Continuous Hinge	A500		ABH
1	Surface Vert Rod Exit, LBR, Classroom	[12] 43 NB8743 ETJ	US32D	Sargent
1	Surface Vert Rod Exit, LBR, Exit Only	[12] 43 NB8710 EO	US32D	Sargent
2	Surface Closer	351 P10	EN	Sargent
2	Kick Plate	K1050 10" high CSK BEV	US32D	Rockwood
2	Electronic Hold Open Device	980M	689	Rixson
1	Perimeter Gasket	S88BL		Pemko
2	Meeting Stile Astragals	303AS		Pemko

Set: 2.0

Description: Single Opening - Stairwell

1	Continuous Hinge	A500		ABH
1	Rim Exit, Classroom	[12] 43 8843 ETJ	US32D	Sargent
1	Surface Closer	351 P10	EN	Sargent
1	Kick Plate	K1050 10" high CSK BEV	US32D	Rockwood
1	Electronic Hold Open Device	980M	689	Rixson
1	Perimeter Gasket	S88BL		Pemko

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. Interior hollow metal doors.
2. Interior borrowed lights, frames and transoms.
3. Interior hollow metal windows.
4. Abuse-resistant film.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

F. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.4 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
   1. Patterned glass.
   2. Coated glass.
   3. Fire-resistive glazing products.
   4. Laminated glass with ceramic frit.
   5. Insulating glass.

C. Glazing Accessory Samples: For gaskets, sealants, and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers manufacturers of insulating-glass units with sputter-coated, low-e coatings glass testing agency and sealant testing agency.

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass glazing sealants and glazing gaskets.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

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

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations for Glass: Obtain laminated glass and insulating glass from single source from single manufacturer for each glass type.

F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

G. 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.
   1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
   2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
   3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
   4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

I. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

J. Preinstallation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review temporary protection requirements for glazing during and after installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

   1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F (4.4 deg C).

1.9 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated- glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

D. Special Installer's Warranty: Provide a written warranty covering workmanship of the glazing installation, and parts and labor for replacement of components furnished by the installer outside the manufacturer's warranty, and agreeing to return to the project site and repair or replace work which is defective or does not conform to the Contract Documents.

1. Warranty Period: 3 years from date of Substantial Completion.

E. Special Warranty, Laminated-Glass Security Glazing: Manufacturer agrees to replace laminated-glass security glazing that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated-glass security glazing contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 and ICC's International Building Code by a qualified professional engineer, using the following design criteria:

1. Design Wind Pressures: As indicated on Drawings.
2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
    a. Wind Design Data: As indicated on Drawings.

C. Design Snow Loads: As indicated on Drawings.

D. Fire Rated glazing assemblies must conform to ASTM E119.

E. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.

F. Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass to resist each of the following combinations of loads:

1. Outward design wind pressure minus the weight of the glass. Base design on glass type factors for short-duration load.
2. Inward design wind pressure plus the weight of the glass plus half of the design snow load. Base design on glass type factors for short-duration load.
3. Half of the inward design wind pressure plus the weight of the glass plus the design snow load. Base design on glass type factors for long-duration load.

G. Glass Type Factors for Patterned, and Sandblasted Glass:

1. Short-Duration Glass Type Factor for Patterned Glass: 1.0.
2. Long-Duration Glass Type Factor for Patterned Glass: 0.6.
3. Short-Duration Glass Type Factor for Sandblasted Glass: 0.5.

H. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.

I. Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.

J. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.

K. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

L. Thermal insulation: U-values equal or less than 0.14.Btu/hour foot square F.

M. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat- strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

2.3 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. For uncoated glass, comply with requirements for Condition A.
3. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Ceramic-Coated Spandrel Glass: Tempered glass, Condition C; with ceramic enamel applied by silk-screened process; complying with Specification No. 95-1-31 in GANA's Tempering Division's "Engineering Standards Manual" and with other requirements specified.

1. Glass: Clear tempered.
2. Ceramic Coating Color and Pattern: As selected by Architect from manufacturer's full range.

2.4 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Subject to compliance with requirements, provide the following:

a. Saflex; Vanceva.

b. Guardian Glass.
c. Viracon.
d. Vitro Glass Industries.

2. Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent- resin interlayer to comply with interlayer manufacturer's written recommendations.
3. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
4. Interlayer Color: Clear unless otherwise indicated.

B. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Laminated-Glass Types" Article.

2.5 ABUSE-RESISTANT GLAZING

A. Manufacturers:

1. Basis of Design: 3M Safety and Security Window Film Anti-Graffiti
2. Acceptable Alternates; Decorative Film, NGS.

2.6 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. 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.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corporation; 791, 795 or 995.
   b. GE Advanced Materials - Silicones; SilGlaze II SCS2800 or SilPruf SCS2000.
   c. May National Associates, Inc.; Bondaflex Sil 295.
   d. Pecora Corporation; 864, 895 or 898.
   e. Polymeric Systems, Inc.; PSI-641.
   f. Sika Corporation, Construction Products Division; SikaSil-C995.
   g. Tremco Incorporated; Spectrem 2 or Spectrem 3.

C. Glazing Sealants for Fire-Resistive Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.
2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 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 sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type 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.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units 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 publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with outdoor and indoor faces.

C. Grind smooth and polish exposed glass edges and corners.

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. Presence and functioning of weep system.
3. Minimum required face or edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary 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. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm) as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system, unless otherwise indicated.

3.8 CLEANING AND PROTECTION

A. Protect exterior 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.

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 substances immediately as recommended by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

SECTION 09 2216

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.

B. Related Requirements:

1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.
2. Section 055000 “Metal Fabrications” for miscellaneous steel supports.

1.3 ACTION SUBMITTALS

A. Initial Submittal: Within 30 days of award the subcontractor must submit a complete list of all the materials including manufacturers, and model numbers where applicable, and lead times to be used to allow for timely delivery of materials.

B. Product Data: For each type of product.

C. Shop Drawings for Special Conditions, including acoustic barrier ceiling assemblies: Show layout, spacings, sizes, thicknesses, and types of non-structural metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

D. Delegated-Design Submittal: For non-structural metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: From ICC-ES.

1.5 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. 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 cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C. Delegated -Design Submittal: Include structural analysis data signed and sealed by the qualified professional engineer licensed and responsible for their preparation. Provide data used as basis for calculations. Refer to Section 01 3300 – Submittal Procedures for detailed Delegated Design Requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Notify manufacturer of damaged materials received prior to installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. Stud depths and gauges indicated are minimums. Increase gauge of studs or decrease spacing to meet indicated performance requirements.

C. Structural Performance: Design non-structural metal framing for special conditions indicated, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated. Design the following systems to withstand loads of framing, attached gypsum and cementitious panels, and applied finishes, including ceramic and porcelain tile.
   1. Provide shop drawings and structural calculations prepared by a qualified structural engineer for special conditions that cannot be designed using stud manufacturer's standard tables, including but not limited to the following:
      a. Openings in partitions larger than 96 inches wide.
      b. Partitions greater than 60 inches in height if suspended from ceiling structure.
      c. Suspended ceilings where carrying channels are supported by hangers with spacing of greater than 48 inches in order to attach to structure.
   2. Limit deflection of walls under five lb./sf. design load as follows:

a. Steel Studs Faced with Gypsum Board: Horizontal deflection of 1/240 of wall height.
b. Steel Studs With Tile Finish: Horizontal deflection of 1/600 of wall height.

3. Suspended Framing Systems:
   a. Tiled Ceilings: Select type, gauge and spacing of hangers and framing to support weight of backer board and tile, with an acceptable factor of safety, and vertical deflection not exceeding l/360 of ceiling span.
   b. Acoustically Isolated Systems: Where ceilings are indicated to be suspended by acoustic-isolation.
4. Maximum spacing is 16 inch on center for all framing members.
5. ASTM C 645 is the guiding reference standard for nonload bearing stud walls. Where these guidelines are exceeded, the following will apply.
   a. Stud depths and gauges indicated in ASTM C 645 are minimums. Increase gauge of studs or decrease spacing to meet indicated performance requirements.
6. Design non-structural metal framing for special conditions indicated, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated. Design the following systems to withstand loads of framing, where there are large quantities of wall supported cabinet work or equipment, attached gypsum and cementitious panels, and applied finishes including ceramic and porcelain tile.
7. At gymnasium walls supporting telescoping stands sway bars, design studs to support the implied horizontal/lateral forces at each stabilizer frame attachment to the studs, for each individual bleacher section. Coordinate lateral forces with telescoping stands vendor as required.
   a. Including climbing wall assembly, gym equipment, acoustic panels, and other wall mounted equipment

2.2 FRAMING SYSTEMS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Manufactures:

1. ClarkDietrich Building Systems; ProSTUD Series.
2. MarinoWare; a division of Ware Industries.
3. SCAFCO Stell Stud Company.

C. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G60, hot-dip galvanized unless otherwise indicated.

D. Studs and Runners: ASTM C 645. Use either steel studs and runners or embossed steel studs and runners.
1. Steel Studs and Runners:
   a. Minimum Base-Metal Thickness: 0.020 inch for embossed studs or 0.033 inch for standard studs.
   b. Depth: As indicated on Drawings.

2. Framing for Surfaces Scheduled to Receive Ceramic Tile: Minimum base-metal thickness, 0.0312 inch.
   a. Depth: As indicated on Drawings.

3. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.
   E. Minimum Base-Metal Thickness: Minimum Base-Metal Thickness: As necessary to meet flexural requirements and screw-pull out resistance equivalent to minimum base metal thickness indicated, and as demonstrating by manufacturer's testing.

F. Deflection Track System: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs. Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with two-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
2. Slotted Deflection Track System: ASTM C 645 top runner with 2-1/2-inch-deep flanges in thickness not less than indicated for studs, installed with studs attached through the slots to accommodate vertical movement.

G. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Fire Trak Corp.; Fire Trak System.
   b. Grace Construction Products; FlameSafe FlowTrak System.
   c. Metal-Lite, Inc.; The System.
   d. Or equal

H. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.033 inch.

I. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.

1. Depth: As indicated on Drawings.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.

J. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.033 inch.
2. Depth: As indicated on Drawings.

K. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

L. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

M. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D226/D226M, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

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

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Plaster Assemblies, GFRP: Also comply with requirements in ASTM C 841 that apply to framing installation.
2. Gypsum Veneer Plaster Assemblies, level 5 finish: Also comply with requirements in ASTM C 844 that apply to framing installation.
3. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

1. Provide metal backing or blocking for attachment of each individual item of subsequent work; attachment of work directly to wall and ceiling finish materials is not permitted. Provide backing of sufficient thickness and profile to withstand imposed loads of attached items, including live loads.
2. Coordinate with work of Division 06 "Miscellaneous Rough Carpentry" for wood blocking.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLATION OF FRAMING SYSTEMS

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
2. Multilayer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
3. Tile Backing Panels: As required by horizontal deflection performance requirements unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
    a. Install two studs at each jamb unless otherwise indicated.
    b. For doors up to 4'-0" wide and weighing 300 pounds or less, install two 0.0312 inch thick studs at each jamb; either nested or with open sides abutting. Anchor strut studs securely to top and bottom runners.
    c. For doors wider than 4'-0" or weighing more than 300 pounds, and for openings for pairs of doors, design framing to meet load conditions; but provide no less than two 0.0312 inch thick studs at each jamb.
    d. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    e. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:
    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches on center.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches on center.

F. Z-Shaped Furring Members:

1. Erect insulation, specified in Division 07 Section "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches on center or as indicated.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches on center.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 FIELD QUALITY CONTROL

A. Professional engineer responsible for the design of the non-structural metal framing shall conduct inspections of the work for which design was provided.

1. Conduct inspections of the non-structural metal framing construction as it is being completed to verify that the framing and connections are installed in accordance with the design.
2. Submit written statement prepared by engineer to Architect at the completion of the work stating that, to the best of the engineer's knowledge, the cold-formed metal framing has been installed in conformance with the design.

END OF SECTION

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Prefabricated gypsum board corner pieces.
3. Acoustical joint sealant.

B. Related Requirements:

1.3 ACTION SUBMITTALS

A. Initial Submittal: Within 30 days of award the subcontractor must submit a complete list of all the materials including manufacturers, and model numbers where applicable, and lead times to be used to allow for timely delivery of materials.

B. Product Data: For the following:

1. Gypsum wallboard, Type X.
2. Mold-resistant gypsum board, Type X.
3. Interior trim.
4. Joint treatment materials.
5. Laminating adhesive.
6. Sound-attenuation blankets.
7. Acoustical sealant.

C. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

D. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

E. Samples for Initial Selection: For each type of trim accessory indicated.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers, and bundles bearing brand name and identification of manufacturer or supplier.

1. Deliver and store materials in accordance with Gypsum Association Publications GA-216, GA-238 and GA-801.

B. 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.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

C. Ceiling and wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 GYPSUM BOARD, GENERAL

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Regional Materials: Products shall be manufactured within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site. If materials are transported by rail or water, the distance transported by rail or water shall be multiplied by 0.25 to determine the distance to Project site.

C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C1396/C1396M.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corp.
      b. Georgia-Pacific Gypsum LLC.
      c. Lafarge North America Inc.
      d. National Gypsum Company.
      e. USG Corporation.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered.

C. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold- resistant core and paper surfaces.

   1. Core: 5/8 inch, Type X.
   2. Long Edges: Tapered.
   3. Mold Resistance: ASTM D 3273, score of 10.

2.5 PREFABRICATED GYPSUM BOARD CORNER PIECES

A. Gypsum Board Fabrications: At the Contractor's option, gypsum board fabrications with corners may be shop-fabricated using specialized equipment which produces precise miters, without the requirement for corner bead.

   1. Manufacturers:

      a. Architectural Forms.
      b. Grabber Construction Products Inc., Panel Max.
      c. Kamco Supply Corporation, Kornerboard.
      d. Performance Contracting Inc.

e. Standard Drywall.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
   a. Cornerbead.
   b. LC-Bead: J-shaped; exposed long flange receives joint compound.
   c. Expansion (control) joint.
   d. Curved-Edge Cornerbead: With notched or flexible flanges.
   e. Specialty Wall Reveal: extruded aluminum reveal, Pittcon Industries Softform STR Series, Model STR-050-063, or similar by Gordon Inc., Flannery Inc..
   f. Specialty Column ring trim: extruded aluminum reveal, Fry Reglet Corporation, column ring DRWT at drywall ceiling and WDM/WRM at acoustic ceiling, or similar by Gordon inc. or Pittcon Industries.

B. Mullion Transition:
1. Mullion Mate by Gordon Inc.
2. Formas Inc.
3. Mull-it-Over.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tille Backing Panels: as recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
   a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound, sanded if required.

D. Joint Compound for Mold- and Moisture-Resistant Gypsum Board: Use setting-type taping compound and setting-type, sandable topping compound; compounded for mold- and moisture resistance.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Adhesives shall have a VOC content of 50 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum,

from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws .

C. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints in accordance with ASTM C840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use at outside corners.
3. LC-Bead: Use where indicated.
4. L-Bead: Use where indicated.
5. U-Bead: Use at exposed panel edges, and where indicated.
6. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim: Install in locations indicated.

3.5 FINISHING OF GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and in accordance with ASTM C840:

1. Level 2: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 4: At all exposed locations unless otherwise indicated to be level 5.
3. Primer and its application to surfaces are specified in Division 09 “Painting."
4. Level 5: At locations indicated to receive wall graphics or any direct applied wall coverings

E. After application of primer specified in Division 09 "Painting," examine surface and patch surface defects, including holes, dings, areas where joint compound in uneven or missing and areas exhibiting high suction adversely affecting paint finish.

3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
1. Indications that panels are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.7 FIELD QUALITY CONTROL

A. Above-Ceiling Observation: Before Contractor installs gypsum board ceilings, Architect will conduct an above-ceiling observation and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.
2. Before notifying Architect, verify that the following Work is complete in areas to receive gypsum board ceilings:
    a. Installation of 80 percent of lighting fixtures, powered for operation.
    b. Installation, insulation, and leak and pressure testing of water piping systems.
    c. Installation of air-duct systems.
    d. Installation of air devices.
    e. Installation of mechanical system control-air tubing.
    f. Installation of ceiling support framing.
    g. Installation of fireproofing.
    h. Installation of firestopping.

3.8 CORRECTION OF WORK

A. Before installation of wood trim inspect wall surfaces to which such trim will be applied for flatness. Correct surfaces so gap between surface-applied trim and the wall does not exceed 1/8 inch; if the gap exceeds 1/8 inch at any location remove trim, fill low areas in wall surface, and re-install trim.

B. After drywall has received prime coat of paint, inspect surfaces; fill, smooth and sand defects.

3.9 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Repair gypsum board that has become damaged during construction prior to application of finishes. Provide repairs that are indistinguishable for surrounding work.

D. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 6513

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient stair accessories.
3. Resilient molding accessories.

1.3 ACTION SUBMITTALS

A. Initial Submittal: Within 30 days of award the subcontractor must submit a complete list of all the materials including manufacturers, and model numbers where applicable, and lead times to be used to allow for timely delivery of materials.

B. Product Data: For each type of product indicated.

C. Samples for Initial Selection: For each type of product indicated.

D. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

E. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Substrate testing: Submit results of concrete substrate relative humidity test, done with in-situ probes, ASTM F 2170.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

B. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to flooring installation including, but not limited to, the following:

1. Review substrate conditions, moisture and pH test results, manufacturer's installation instructions, and warranty requirements.
2. Document proceedings, including required corrective measures.

D. Mockups: Provide resilient products with mockups specified in other Sections.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.8 PROJECT CONDITIONS

A. Temporary Support Facilities: Furnish and install all temporary lifts, hoists, staging, scaffolding, rigging, labor and materials, and temporary support to perform all operations in connection with the installation of this Work. Remove all temporary support facilities when no longer required.

B. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

C. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

D. Install resilient products after other finishing operations, including painting, have been completed.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.10 WARRANTY

A. Provide manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 RESILIENT BASE

A. Resilient Base:

1. Manufacturers: Basis of Design: Subject to compliance with requirements, provide Johnsonite; a Tarkett company; or comparable product by one of the following:

    a. Flexco.
    b. Roppe Corporation.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Straight (flat or toeless) at carpet and carpet tile; Cove (base with toe) at other locations.
4. Certification Standard: FloorScore.

C. Minimum Thickness: 0.125 inch.

D. Height: 4 inches or as indicated on Drawings.

E. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.

F. Outside Corners: Preformed.

G. Inside Corners: Job formed.

H. Finish: As selected by Architect from manufacturer's full range.

I. Colors and Patterns: As selected by Architect from full range of industry colors.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

1. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

B. Adhesives shall have a VOC content of 50 g/L or less and 60 g/L or less for rubber stair treads.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

E. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
    a. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they are to be installed.
   1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

   1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
   2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

   1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
   2. Tightly adhere to substrates throughout length of each piece.
   3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
   4. Provide tread with contrasting color nosing as indicated.

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

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.

1. Apply four coat(s).

E. Cover resilient products until Substantial Completion.

END OF SECTION

SECTION 09 9100

PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Paint exposed surfaces, except where these Specifications indicate 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, conduit and ducts, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

1.3 DEFINITIONS

A. MPI: Master Painters Institute.
1. See link at http://paintinfo.com/mpi/approved/Partner_index.shtml for products which comply with MPI number classifications.

B. Paint: Fillers, primers, intermediate coats, topcoats, stains, varnishes, transparent finishes, and specialty coatings.

C. Exposed: Exposed to view including areas visible through or behind built-in fixtures. Items or surfaces on the exterior or interior of the Project which can be seen by a person outside or inside the building during normal activity is "exposed." Surfaces and equipment exposed to view inside mechanical and electrical rooms, air handling rooms, and storage rooms and penthouses shall be considered "exposed." The interiors of closets and alcoves shall be considered "exposed," and shall be finished to match the finish of the adjoining room or space, unless another finish is shown.

D. Semi-Exposed: Partly exposed to view, or partly obscured, and includes areas visible through grilles, perforated or louvered covers, air intake and exhaust registers and similar items, including interior of ductwork.

E. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, Flat.

F. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, Flat.

G. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, Eggshell.

H. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, Satin.

I. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, Semi-gloss.

J. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, Full-gloss.

K. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523, Full-gloss.

1.4 ACTION SUBMITTALS

A. Initial Submittal: Within 30 days of award the subcontractor must submit a complete list of all the materials including manufacturers, and model numbers where applicable, and lead times to be used to allow for timely delivery of materials.

B. Product Data: For each type of product indicated.

C. Samples for Initial Selection: For each type of topcoat product indicated.

D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
   1. Use representative colors. Resubmit until required sheen, color, and texture are achieved.
   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.
   5. Submit Samples on rigid backing, 12 inches square.
      a. Concrete: Two 4-inch- square samples.
      b. Concrete Masonry: Two 4-by-8-inch samples of masonry, with mortar joint in the center.
      c. Painted Wood: Two 12-inch- square samples on hardboard.
      d. Stained or Natural Wood: Two 4-by-8-inch samples of natural- or stained-wood finish on specified species and cut of wood.
      e. Ferrous Metal: Two 4-inch- square samples of sheet metal and two 8-inch-long samples of metal trim.
      f. Gypsum Board: Two 12 inch square samples on hardboard.

E. 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 coating specified in Part 2, with the proposed product highlighted.
   3. VOC content.

F. Qualification Data: For firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

1.5 MAINTENANCE MATERIALS SUBMITTALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
   1. Quantity: Furnish an additional five percent, but not less than one unopened gallon of each material and color applied.

1.6 QUALITY ASSURANCE

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

B. Applicator Qualifications: A firm or individual experienced in applying paint and coatings similar in material, design and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
      a. Wall and Ceiling Surfaces: Provide samples of at least 100 square feet.
      b. Other Items: Architect will designate items or areas required.
   2. Apply mockups after permanent lighting and other environmental services have been activated. If permanent lighting is not in place, provide temporary lighting to simulate permanent lighting.
   3. In addition to paint mockups, complete painting of room mockup specified in Division 01 Section "Mockups."
   4. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.
   5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label on each container.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambi-

ent temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than five deg F above the dew point; or to damp or wet surfaces.

C. Do not begin priming or painting until general illumination is provided as specified in Section 015050 "Temporary Facilities" and Division 26 electrical Sections specifying temporary lighting.

D. Coordinate painting work with other work, including cleaning, so dust, dirt and other contaminants do not fall on wet paint. Prepare and repaint surfaces that have been damaged by dust and dirt embedded in paint.

E. Temporary Support Facilities: Furnish and install all temporary lifts, hoists, staging, scaffolding, rigging labor and materials and temporary support to perform all operations in connection with installation of this work. Remove all temporary support facilities when no longer needed.

1.9 CLOSEOUT SUBMITTALS

A. Maintenance Data: For coatings to include the following:

1. Area summary with Finish Schedule and area detail designating where each product, color and finish is used.
2. Product data pages
3. Material safety data sheets.
4. Care and cleaning instructions
5. Touch up procedures
6. Color samples of each color and finish (gloss level) used.

B. Sherwin Williams: "Custodian Project Color and Product information" manual or equal.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products included on the current MPI "Approved Product List," and supplied by one of the following manufacturers. Products by the following manufacturers that are not included on the MPI "Approved Product List" are not acceptable unless specifically listed. Manufacturer names used in this Section are indicated by the abbreviation in parentheses.

B. Manufacturer Abbreviations: Manufacturer names used in this Section are indicated by the abbreviation in parentheses:
   1. Basis of Design: Sherwin-Williams Company.
   2. Benjamin Moore & Co.
   3. PPG Architectural Finishes, Inc.
   4. Tnemec Company, Inc.
   5. Carboline Company.

2.2 MPI PERFORMANCE CRITERIA

A. MPI Products: Where specific MPI product numbers are indicated for a particular coating, comply with the following:
   1. Proposed product must be included on the current MPI "Approved Product List. Products listed under specific MPI product numbers in Part 2 systems were included on the MPI “Approved Product List” at the time of bidding, and are acceptable if not listed at the time submittals are prepared.
   2. Proposed products that are not included on the current MPI "Approved Product List" are not acceptable.
   3. Other products listed on the MPI “Approved Product List” by one of the acceptable manufacturers may be used.
   4. Products from manufacturers listed in the “Manufacturers” Article must be listed in the MPI “Approved Product List.”

B. Non-MPI Products: Where specific products are indicated without a reference to an MPI product number, provide one of the indicated products.

2.3 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:
   1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Emissions Requirements: Interior field-applied paints and coatings that are inside the weatherproofing system shall comply with either of the following:
   1. Low-Emitting Materials: VOC emissions shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
   2. VOC content shall not exceed limits of authorities having jurisdiction and the following:
      a. Flat Coatings: 50 g/L.
      b. Nonflat Coatings: 50 g/L.
      c. Primers, Sealers, and Undercoats: 100 g/L.
      d. Shellacs, Clear: 730 g/L.
      e. Shellacs, Pigmented: 550 g/L.

D. VOC Content: Exterior field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
   1. Flat Paints and Coatings: 50 g/L.
   2. Nonflat Paints and Coatings: 50 g/L.
   3. Dry-Fog Coatings: 150 g/L.
   4. Primers, Sealers, and Undercoaters: 100 g/L.
   5. Rust-Preventive Coatings: 100 g/L.
   6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
   7. Pretreatment Wash Primers: 420 g/L.
   8. Shellacs, Clear: 730 g/L.
   9. Shellacs, Pigmented: 550 g/L.

E. Color and Sheen: Furnish paints in colors and glosses or sheens indicated in the Finish Schedule. Where colors are not indicated, Architect will specify colors by reference to one manufacture's color names, or by furnishing color chips to the Painting Subcontractor.
   1. Paint colors, names, numbers or chips selected by the Architect may be from any manufacturer and will not be limited to colors in the line of the proposed paint materials manufacturer. Custom-match selected colors in the brand of materials proposed and submit specified samples.
   2. To the extent color and sheen are not indicated, they will be selected by the Architect as the work progresses. In no instance will color and sheen selection be assigned to the Painting Subcontractor.

F. Accent Colors:
   1. Accent colors or deep tone shades may be selected by the Architect in amounts up to 10 percent of the total area painted in the project.

2.4 INTERIOR PAINT SYSTEMS, CONCRETE AND MASONRY

A. Concrete Substrates, Nontraffic Surfaces; Institutional Low-Odor/VOC Latex System:
   1. Typical Surfaces: Concrete walls and ceilings.
   2. Prime Coat: Sherwin Williams, Loxon and Masonry Primer/Sealer
   3. Intermediate Coat: Same as Topcoat.
   4. Topcoat: Shrewin Williams, Pro Mar Zero VOC (Flat, Eggshell, Semigloss).

B. Concrete Substrates, Traffic Surfaces; Low-VOC Epoxy:
   1. Typical Surfaces: Concrete floors.
   2. Prime Coat: Same as topcoat.
   3. Topcoat: Armorseal 8100 Clear (Satin, or Gloss).

C. Concrete Substrates, Traffic Surfaces; Water-Based Clear Sealer System:
   1. Typical Surfaces: Concrete floors.
   2. First Coat: Same as topcoat..
   3. Topcoat:.

D. CMU Substrates; Institutional Low-Odor/VOC Latex System:
   1. Typical Surfaces: CMU walls.
   2. Prime Coat: Sherwin Williams, Prep Rite Block filler, latex, interior/exterior.

3. Intermediate Coat:
4. Topcoat:

E. CMU Substrates; Epoxy, Tile-Like, for Dry Environments:
1. Prime Coat:; Sherwin Williams, Prep Rite Block filler, latex, interior/exterior, as recommended by the topcoat manufacturer for CMU substrates.
2. Intermediate Coat: Same as Topcoat.
3. Topcoat: Sherwin Williams, Pro Industrial WB Pre-Catalyzed Epoxy (K45 Eggshell or K46 Semi Gloss)

F. CMU Substrates; High Performance:
1. Prime Coat:; Sherwin Williams Pro Industrial Heavy Block filler or Prep Rite Block Filler, latex, interior/exterior; for use with high performance topcoats; and as recommended by the topcoat manufacturer.
2. Intermediate Coat: Same as Topcoat.
3. Topcoat: Sherwin Williams, B73 Catalyzed Epoxy Water-Based (Eggshell or Gloss).

2.5 INTERIOR PAINT SYSTEMS, GYPSUM

A. Gypsum Board Substrates; Institutional Low-Odor/VOC Latex System:
1. Typical Surfaces: Gypsum board ceilings, unless other paint system is indicated.
2. Prime Coat: Sherwin Williams, Pro Mar 200 Zero VOC Primer Tinted primer may be needed if dark top coat.
3. Intermediate Coat: To match top coat.
4. Topcoat: Sherwin Williams Pro Mar 200 Zero VOC (Flat, Eggshell or Semigloss).

B. Gypsum Board Substrates; Epoxy, Tile-Like, for Dry Environments:
1. Prime Coat:; Sherwin Williams Pro Mar 200 Zero VOC Primer.
2. Intermediate Coat: To match topcoat.
3. Topcoat: Sherwin Williams Pro Industrial Pre-Catalyzed Epoxy (K45 Eggshell or K46 Series Semigloss).

C. Gypsum Board Substrates; High Performance:
1. Prime Coat: Sherwin Williams Pro Mar 200 Zero VOC primer. Tinted primer may be needed if dark top coat.
2. Intermediate Coat: To match top coat.
3. Topcoat: Sherwin Williams Pro Industrial Water-Based Catalyzed B73 series (Eggshell or Gloss).

2.6 INTERIOR PAINT SYSTEMS, STEEL

A. Overhead Steel Substrates; Water-Based Dry-Fall System:
1. Typical Surfaces: Overhead steel surfaces including structural steel and steel joists.
2. Application: Shop-apply prime coat where indicated in Division 05 Sections.
3. Intermediate Coat: To match topcoat.
4. Topcoat: Sherwin Williams Dryfall B42 WB over properly primed.
5. Touchup: ProCryl Primer as required.

B. Overhead Galvanized Steel Substrates; Water-Based Dry-Fall System:
1. Typical Surfaces: Ductwork and steel deck.

2. Intermediate Coat: To match topcoat.
3. Topcoat: Sherwin Williams Dryfall B42 WB over properly primed.
4. Touchup: ProCryl Primer as required.

C. Steel Substrates; Institutional Low-Odor/VOC Latex System:
1. Typical Surfaces: Steel surfaces including interior hollow metal doors and frames, steel railings, structural steel, and steel joists.
2. Prime Coat: Sherwin Williams Pro Cryl Primer.
3. Intermediate Coat: to match Topcoat.
4. Topcoat: Sherwin Williams Pro Industrial Acrylic (Matte, Eggshell, Semigloss, Gloss).

D. Steel Substrates; Epoxy, water borne:.
1. Prime Coat: Sherwin Williams, CtPro Cryl Primer.
2. Intermediate Coat: Same as topcoat.
3. Topcoat: Sherwin Williams Pre-Catalyzed Epoxy (K45 Eggshell or K46 Series Semi-gloss).

E. Galvanized Steel Substrates; Institutional Low-Odor/VOC Latex System:
1. Prime Coat: Sherwin Williams ProCryl
2. Intermediate Coat: to match topcoat
3. Topcoat: Sherwin Williams Pro Industrial Acrylic.

F. Metal Substrates, Not Primed; Polyurethane, Pigmented over field-applied high-build epoxy intermediate coat: .
1. Typical Surfaces: Interior and exterior surfaces of exterior hollow metal doors and frames; metal surfaces primed with universal metal primer.
2. Prime Coat: Sherwin Williams ProCryl for Metal Substrates.
3. Topcoat: Sherwin Williams Pro Industrial Acrylic.

G. Acoustical Ceiling Deck, Not Primed; Polyurethane, Pigmented over field-applied high-build epoxy intermediate coat: .
1. Typical Surfaces: Interior and exterior surfaces of exterior hollow metal doors and frames; metal surfaces primed with universal metal primer.
2. Intermediate Coat: Procoustic Products, as recommended by the topcoat manufacturer.
3. Intermediate Coat: to match topcoat.
4. Topcoat: Procoustic Products.

2.7 INTERIOR PAINT SYSTEMS, WOOD

A. Wood Substrates; Institutional Low-Odor/VOC Latex System:
1. Typical Surfaces:
2. Prime Coat: Sherwin Williams Pro Mar 200 Zero VOC Primer.
3. Intermediate Coat: to match topcoat.
4. Topcoat: Sherwin Williams Pro Industrial Acrylic (Matte, Eggshell, Semi Gloss or Gloss).

2.8 INTERIOR INTUMESCENT COATING

A. Basis of Design: Sherwin Williams Firetex FX5120 or equal.

2.9 SPECIAL SURFACES

A. Paint for Coating Intumescent Fireproofing: Provide two coats of latex, semi- gloss paint which is compatible with the intumescent fireproofing and that meets the following requirements:
   1. Paint is recommended by the paint manufacturer for use over intumescent fireproofing.
   2. Paint is approved by the fireproofing manufacturer for use as top-coat over its product.
   3. Provide appropriate intermediate coat if recommended by either the fireproofing or paint manufacturer. Refer to Section 07 for Intumescent Fireproofing and Section 05 for approved primer coats under intumescent fireproofing.

B. Wood-Fiber Acoustical Panels (Tectum):; Acceptable to the panel manufacturer, which is non-bridging, and which will not affect the acoustical properties of the material.
   1. Intermediate Coat: Same as topcoat.
   2. Topcoat:

C. Duct, Equipment, and Pipe Insulation, with All Service Jacket:
   1. Typical Surfaces: Insulated piping in mechanical rooms for color identification; insulated piping in other locations where exposed to view.
   2. Primer: Sherwin Williams Pro Cryl Primer
   3. Intermediate Coat: Same as topcoat.
   4. Topcoat: Sherwin Williams Pro Industrial Acrylic.

2.10 PRIMERS

A. MPI Products: Included on MPI's "Approved Products List."

2.11 TOPCOATS

A. MPI Products: Included on MPI's "Approved Products List."

2.12 MISCELLANEOUS MATERIALS

A. Latex Joint Sealant: Siliconized acrylic latex or acrylic latex, ASTM C 834, Type OP, Grade NF.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. BASF Building Systems; Sonolac.
      b. May National Associates, Inc.; Bondaflex.
      c. Pecora Corporation; AC-20+ Silicone.
      d. Tremco Incorporated; Tremflex 834.
      e. Sherwin Williams; 950A, acrylic latex.
      f. Sherwin Williams; C-920, siliconized acrylic.

2.13 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample paint materials. Painting Subcontractor shall be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Painting Subcontractor to stop applying coatings if test results show materials being used do not comply with product requirements. Painting Subcontractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Painting Subcontractor shall be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. CMU Masonry: 12 percent.
   3. Wood: 15 percent.
   4. Gypsum Board: 12 percent.
   5. Plaster: 12 percent.

C. Alkalinity: Test alkalinity of concrete, CMU and plaster surfaces using method recommended by coating manufacturer.

D. Maximum Moisture Content of Concrete Floors: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor- emission rate of three lb of water/1000 square feet of slab in 24 hours.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
   1. Notify the Architect of incompatibilities between coatings specified in this Section and shop-applied primers and coatings specified or applied in other Sections.

F. Verification of Preparation Completed in Other Sections:
   1. Work specified in other Sections in intended to provide surfaces that are smooth, sound, and fully-cured; suitable for painting, except to the extent specified in this section. Painting work is not intended to include more than minor spackling, caulking of gaps at changes of materials, light hand sanding of millwork and carpentry items.
   2. Verify that sealing of gaps between gypsum board and abutting surfaces, such as frames, windows and masonry, has been completed as specified in Section 079200 "Joint Sealants."
   3. Concrete and CMU: Verify that voids and bug holes that cannot be properly coated

by the specified primer or block filler have been filled.

4. Gypsum Board: Verify that finishing compound is sanded smooth. After application of prime coat, require installer of substrate to return to the job to repair imperfections that became visible after the prime coat was applied.
5. Shop-Primed Steel: Verify that touch-up of damaged shop-primer and bare areas has been completed by the applicator of the shop-applied primer.
6. Galvanized Steel: Verify that damaged galvanizing has been touched up with zinc-rich primer prior to application of primer.
7. Schedule installation of finish hardware, wall plates, and similar applied items which are not being painted after painting is completed, or, if necessary to maintain the schedule and acceptable to Architect, until at least the first top-coat has been applied.

G. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes applicator's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. 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.

C. Seal cracks and gaps where drywall abuts other materials, including masonry, hollow metal frames, windows and similar locations to provide a smooth surface for finish painting. Use acrylic latex sealant applied in accordance with the manufacturer's recommendations. Tool beads to insure full, firm contact with both faces of the joint, strike off excess sealant and finish to a smooth, wrinkle-free, slightly concave surface.
1. Provide full bed of sealant at joint where door frame sits on floor slab.

D. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
1. Provide barrier coats over incompatible primers or remove and reprime with compatible primers to produce paint systems indicated.

E. Concrete and CMU Walls: Remove release agents, curing compounds, efflorescence, and chalk using mechanical methods if needed. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
1. Allow substrates to cure a minimum of 14 days, or longer if recommended by manufacturer.
2. Use abrasive or brush-off blast cleaning if recommended by manufacturer.

F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
1. Interior Steel: Provide SSPC-SP-2, “Hand Tool Cleaning” or SSPC-SP3, “Power Tool Cleaning” as recommended by the primer manufacturer.
2. Exterior Steel: Provide SSPC-SP6, “Commercial Blast Cleaning” unless indicat-

ed otherwise.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. 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.

I. Prefinished Metal Substrates: Sand lightly to create surface profile and ensure bond of prime coat.

J. Piping: Do not paint piping while hot. Schedule Work such that pipes remain cold until paint has fully dried.

K. Wood Substrates:
1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

L. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

M. Plaster Substrates: Do not begin paint application until plaster is fully cured. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

3.3 PREPARATION FOR CONCRETE SLABS TO RECEIVE SEALER AND PAINT

A. Concrete Floors: Allow concrete to cure a minimum of 28 days. Remove curing compounds, hardeners and sealants with brush-off blast cleaning or mechanical abrasion to provide surface profile recommended by the coating manufacturer. Prepare surfaces in accordance with SSPC-SP13 or ICRI CSP-1 and coating manufacturer's instructions. Remove protrusions and fins; fill voids with material recommended by the coating manufacturer. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

B. Prepare new concrete slabs to receive sealer and paint in accordance with the following. Prepare substrates according to manufacturer's written instructions to ensure adhesion of sealer and paint.

C. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.

4. Porosity Testing: Perform tests as follows prior to installation of flooring.

    a. Perform water absorption testing in accordance with ASTM F 3191 to determine if the substrate surface is porous or non-porous.
    b. Substrate and ambient temperature: 75 +/- 10 degrees F.
    c. Ambient humidity: 50 +/- 10 percent relative humidity.

D. Remove substrate coatings and other substances that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

E. Joint Preparation: Honor all moving expansion and isolation joints up through the underlayment. Fill all non-moving joints with manufacturer's recommended filler material.

3.4 APPLICATION

A. Apply paints according to manufacturer's written instructions, including application rate, drying time between coats, and compatibility of coating materials and substrates. Sand between coats where recommended by the manufacturer, and where necessary to remove imperfections in preceding coats.

B. Match approved mock-ups for color, texture and coverage. Remove, refinish or recoat Work that does not match mock-ups.

C. Use applicators and techniques suited for paint and substrate indicated. Use brush or roller unless the coating manufacturer requires spray application.
    1. Obtain Architect's approval for spray application of coatings other than those that are required by the manufacturer to be sprayed. Demonstrate suitability of completed application by providing an additional mock-up and obtaining Architect's approval.

D. Tint primers and undercoats as recommended by the paint manufacturer to improve hiding and coverage when using deep-toned topcoats, and when recoating existing surfaces.

E. 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.

F. Priming: Touch up or recoat primed surfaces showing evidence of suction or unsealed surfaces.

G. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

H. 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.

3.5 EXTENT OF WORK

A. Paint each exposed and semi-exposed surface, both new and existing, within project site unless specifically excluded in this Section. For surfaces not identified or scheduled, paint with suitable system for the most similar substrate listed.

B. Concealed Surfaces: Paint concealed surfaces where indicated or scheduled.
   1. Prime surfaces to be covered by permanently-fastened items, including acoustical panels, casework, and wood paneling. Intermediate coat and topcoat may be omitted.
   2. Prime surfaces scheduled to receive wallcovering.
   3. Prime and paint surfaces behind furniture and shelving even when fastened to substrate.
   4. Prime surfaces behind permanently affixed equipment other than furniture and shelving. Intermediate coat and topcoat may be omitted.

C. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces.

D. Paint front and backside of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

E. Roof-Mounted Items:
   1. Factory-finished mechanical equipment.
   2. Paint black-iron gas piping.
   3. Paint steel rooftop equipment supports.

F. Shop-Primed Surfaces:
   1. Provide additional coat of primer on structural steel, metal fabrications, and shop- or factory-primed steel doors and frames. Do not omit primer scheduled in this Section. Shop- and factory-applied primers are considered temporary protection but not a permanent finish.
      a. Exception: Primer may be omitted on structural steel shop-primed with high- performance finish.
   2. Primer may be omitted on structural steel, metal fabrications, and shop- or factory-primed steel doors and frames, provided these have been properly primed with a primer compatible with the field-applied coats. Where topcoat is not compatible with existing primer, provide compatible intermediate coat.

G. Factory-Finished Surfaces: Prime and paint surfaces of the following factory-finished items:
   1. Fire extinguisher cabinets.

H. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

   1. Paint the following work where exposed in equipment rooms and where mounted on ceilings or walls scheduled to be painted:
      a. Equipment, including panelboard tubs.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal and plastic conduit and raceway.
      f. Tanks that do not have factory-applied final finishes.
      g. Duct, equipment, and pipe insulation having all-service jacket material.
   2. Paint items exposed in occupied spaces. Prime pre-finished items prior to application of topcoat. Items to be painted include, but are not limited to, the following:
      a. Equipment, including panelboards.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Ductwork, including ductwork insulation with service jackets

e. Portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
f. Hangers and supports.
g. Metal and plastic conduit and raceway.
h. Switchgear.
i. Panelboards.
j. Panelboard covers.
k. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
l. Mechanical and electrical equipment that is indicated to have a factory-primed finish for field painting.
m. Exceptions: Do not paint fire alarm system raceway components furnished in red color.

I. Labels: Do not paint over the following items:
1. Underwriters Laboratories, Factory Mutual or other certification labels which indicate compliance with test standards.
2. Labels and plates on equipment indicating name, identification, performance rating, or nomenclature.
3. Piping and valve identification decals and labels.

J. Surfaces Not Requiring Painting:
1. Items specified to be shop-finished, such as wood doors and architectural woodwork. Touch-up shall be by the trade furnishing the item to ensure compatibility of materials and uniformity of appearance.
2. Concealed surfaces inside shafts, crawl spaces, furred areas, utility tunnels, and spaces above hung ceilings, including utilities, machinery and equipment in concealed spaces.
3. Factory-painted manufactured items, unless otherwise specified to be repainted.
4. Utility piping and ductwork in mechanical and electrical rooms that are mounted to walls or ceilings not indicated on the Room Finish Schedule to be painted.
5. Exposed concrete floors in utility areas, unless specifically noted to be painted.
6. Gypsum board surfaces which are to be covered by tile.

3.6 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Painting Subcontractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Painting Subcontractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.7 CORRECTION OF WORK

A. Provide additional coat to surfaces when undercoats or existing finishes show through topcoat.

B. Sand and repaint surfaces which have embedded dust or dirt, runs or sags or

other imperfections. Re-prime if sanding exposes substrate.

C. When touching up or correcting surfaces with MPI gloss level 3 or above, paint entire surface to a natural break to avoid the appearance of lap-marks.

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 and leave in an undamaged condition.

D. Dry-Fall Cleanup: After application of dry-fall coatings, thoroughly vacuum surfaces that have collected dust as a result of painting, including upward-facing surfaces of structural members.

E. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting, remove temporary protective wrappings to protect the Work.

F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.9 GLAZING SCHEDULE

A. Color: Coordinate with facilities to match existing colors.

END OF SECTION