PROJECT MANUAL FOR
THE CONSTRUCTION OF

GILEAD-BLOOMFIELD COMPLEX RENOVATION
MACON-BIBB COUNTY
1931 ROCKY CREEK ROAD
MACON, GEORGIA 31206

OWNER:
EAST POINT CITY COUNCIL
3121 NORMAN BERRY DRIVE
EAST POINT, GEORGIA 30344

ARCHITECT:
SIZEMORE GROUP, LLC
342 MARIETTA STREET, UNIT 3
ATLANTA, GEORGIA 30313

MECHANICAL/ELECTRICAL/PLUMBING:
NOTTINGHAM, BROOKS & PENNINGTON
MACON, GEORGIA

SPECIFICATIONS CONSULTANT:
SPIKER BALDIN ASSOCIATES
NORCROSS, GEORGIA

DOOR HARDWARE CONSULTANT:
PHILLIPS-LANGLEY & ASSOCIATES
SUWANEE, GEORGIA

SEPTEMBER 1, 2017

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SECTION 01 1100

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. The scope of work includes the conversion of the existing Multi-Purpose Room in the Gymnasium Building into an Office, Game Area, Restrooms and Classroom as follows:
   1. Demolition of existing temporary partition, ceilings, floor finishes and HVAC system serving this area.
   2. Construction of new exterior egress door and prefabricated stair.
   3. Construction of new partitions, doors and ceilings with new lighting, HVAC systems, plumbing, and life safety systems.

1.2 WORK RESTRICTIONS:

A. The building is to remain operational during sporting events at Gymnasium. Coordinate access to the existing restrooms and the scheduling of the shut down of the electrical systems with the Owner.

B. Nonsmoking building: Smoking is not permitted within the building or within 25’-0” of entrances, operable windows, or outdoor-air intakes.

C. Controlled substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.3 OWNER FURNISHED, OWNER INSTALLED WORK (OFOI):

A. The following work will be provided by the Owner under separate contracts. Contractor shall install outlet boxes and conduits with pull strings at the ceiling plenum as indicated on electrical drawings.
   1. Telephone/data system.
   2. Security system.

1.4 OWNER FURNISHED, CONTRACTOR INSTALLED WORK (OFCI):

A. The following work will be furnished by the Owner and to Contractor for installation by Contractor. Contractor shall coordinate delivery of materials to project site. Contractor shall include cost of installation in Contract Amount.
   1. Television monitors and mounting brackets.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 2513

PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work specified elsewhere:
1. Product Requirements section, Paragraph 1.2, A. Product Quality Assurance.

1.2 PRODUCT SUBSTITUTION PROCEDURES:

A. Products are specified by reference standards, performance and manufacturer's name and model number or trade name.
1. When specified only by reference standard or performance, Contractor may select any product meeting specified standards or performance requirements, by any manufacturer.
2. When several products or manufacturers are specified as being acceptable, Contractor has the option of choosing among those named.
3. When one product or manufacturer is specified or indicated as the "basis of design", "basis of selection" or "scheduled", Contractor shall bear costs associated with changes required for application or installation of other products or assemblies.
4. When proprietary products are specified, substitutions will be allowed only by substitution provisions specified herein, unless it is specifically stated that no substitutions are allowed.

B. If it is desired to use products different from those indicated in the Contract Documents, the party requesting the substitution shall make written application on form provided at the end of this section and as described herein. The burden of proving equality of proposed substitutions rests with the party making the request for substitution.
1. Requests for substitution shall reach Architect not less than ten days prior to date set for opening of bids. Requests received by Architect after this date will not be considered.
2. Requests for substitution shall be accompanied by research and/or test reports evidencing compliance with building code in effect for Project, from ICC-ES or other independent testing laboratory located in the United States.
3. Requests for substitution shall be accompanied by such technical data and samples as the party making the request desires to submit. Architect will consider reports from independent testing laboratories, verified experience records from previous users, and other printed or written information valid in the circumstances.
4. Requests for substitution shall indicate in what respects proposed materials or products differ from those specified and the effect on interfacing or related work.
5. Requests for substitution shall be accompanied by the manufacturer's dated product data describing the installation, use and care, as applicable, of proposed substitution. Include reference standards, test data and clarification drawings.

6. Requests for substitution shall be accompanied by complete cost data indicating material cost, installed cost and savings, if any, resulting from proposed substitution.
7. Determination as to acceptability of proposed substitutions will be made based only on data submitted.
8. Contractor shall coordinate installation of accepted substitutions with interfacing work, bearing re-design costs and making approved changes in the Work to properly incorporate the substitutions, and shall waive all claims for additional costs related to use of acceptable substitutions which become apparent following acceptance.
9. Contractor shall be responsible for payment of time for research, evaluation, selection and re-design costs incurred by Architect and his consultants for substitutions.

C. An addendum will be issued to Bidders not less than four days prior to the date set for opening of Bids if a proposed substitution is accepted by Architect. Unless substitutions are received and approved as described above, the successful Bidder shall be responsible for furnishing materials and products in accord with the Contract Documents.

D. In the event that specified items cannot be delivered to the job site and incorporated into the Work at such times and in such quantities as to cause no delay, then Contractor may request a substitution in the manner described above. Should the accepted substitution provide a cost savings, the Contract price will be adjusted by Change Order, with Owner receiving the benefit of the net savings. No increase in the Contract price will be allowed on substitutions made after the receipt of Bids, except where the Contractor can verify a timely placement of orders appropriate to the materials and conditions involved.

E. Inability to obtain specified items due to Contractor's failure to place timely orders will not be considered reason for authorizing substitutions.

End of Section

SUBSTITUTION REQUEST FORM

NOTE: This form is for use by Prime Construction Contractor only. Submittals by others will be returned with no response.

PROJECT: _____

LOCATION: _____

OWNER: _____

DATE: _____

We hereby submit for your consideration the following substitution instead of the item specified or shown on the drawings:

Section:	Paragraph:	Specified Item:
_____	_____	_____

Proposed Substitution:

_____

_____

_____

Submit research and/or test reports evidencing compliance with building code in effect for Project, from ICC-ES or other independent testing laboratory located in the United States.

Submit manufacturer's certification that products to be supplied to this project have been manufactured in accord with the product requirements contained in the Product Requirements section of the Project Manual.

Attach complete product data, drawings and descriptions of product, with fabrication and installation details. Provide laboratory tests if applicable.

Provide sample, if applicable. Indicate if sample will be provided under separate cover.

Include complete information on changes to drawings and/or specifications that proposed substitution will require for its proper installation.

Fill in blanks below: (Include attachments if space is insufficient. Failure to provide information will void submittal.)

A. Reason(s) for proposed substitution: (check all that apply):

__ 1. Request is equivalent to product/material/ assembly specified. (Note: Attach technical documentation.)

__ 2. Specified product or method cannot be provided within the Contract Time. (Note: This request will not be considered if the product or method cannot be provided as a result of the Contractor's failure to pursue the work promptly, or to coordinate the various activities properly, or if the Contractor fails to place timely orders.)
__ 3. Specified product or method cannot receive necessary approval by a governing authority, and the Contractor certifies that the requested substitution can be approved.
__ 4. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting redesign and evaluation costs and the increased cost of other work by the Owner or separate contractors, and similar considerations.
__ 5. Specified product or method cannot be provided in a manner which is compatible with other materials of the work, and the Contractor certifies that the substitution will overcome the incompatibility.
__ 6. Specified product or method cannot be properly coordinated with other materials in the work, and the Contractor certifies that the proposed substitution can be properly coordinated.
__ 7. Specified product or method cannot receive a warranty as required by the Contract Documents, and the Contractor certifies that the proposed substitution can receive the required warranty.

B. Does the substitution affect dimensions or details shown on drawings:

___ No.

___ Yes. (Attach marked up prints of drawings showing changes required.)

C. What effect does the substitution have on other trades?

_____

_____

_____

D. Compare significant qualities of proposed substitution with those of work or product originally specified or shown on drawings. Include elements such as size, weight, durability, performance, visual effect, etc.

_____

_____

_____

E. Coordination information. Include all changes required in other elements of the work in order to accommodate the substitution, including work performed by the Owner or separate contractors.

_____

_____

_____

F. State effect the substitution will have on the work schedule in comparison to the schedule which would prevail without the proposed substitution. State the effect of the proposed substitution on the Contract Time.

_____

_____

_____

G. Provide complete cost information, including a proposal of any net change in the Contract Amount.

_____

_____

_____

H. Manufacturer's warranties of the proposed and specified items are:

___ Same ___ Different (explain on attachment)

The Undersigned Contractor certifies its opinion that, after thorough evaluation, the proposed substitution will result in work that in every significant respect will be equivalent to or superior to the work required by the original Contract Documents and that it will perform adequately in the application indicated. Rights to additional payment or time because of failure of the substitution to perform adequately are hereby waived.

The Undersigned hereby agrees to pay in full for any changes to design, including detailing and engineering costs caused by the requested substitution.

Submitted by: NOTE: Submittal void and will be discarded if unsigned or if signed by entity other than General Construction Contractor.

Signature: _____

(Contractor's Authorized Representative)

_____

(Title)

Contractor's Firm Name: _____

Date: _____

For use by Architect:

___ Accepted ___ Accepted as Noted

___ Not Accepted ___ Received Too Late

By: _____
(Signature and printed name)

Date: _____

Remarks: _____

_____

_____

_____

End of Form

SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY:

A. Definitions:
1. Submittals: General term including samples, shop drawings and product data, as applicable.
2. Shop drawings: Drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
3. Product data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.
4. Samples: Physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

B. Shop drawings, product data, samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which submittals are required.

C. General provisions:
1. Provisions in this section are mandatory procedures for preparing and submitting shop drawings, product data, samples, and similar submittals.
2. Shop drawings, product data, samples and similar submittals shall be in orderly sequence and timed to cause no delay in the Work.
3. Job delays occasioned by requirement of resubmission of samples, shop drawings and product data not in accord with Contract Documents are Contractor's responsibility and will not be considered valid justification for extension of Contract time.
4. Commence no portion of work requiring a submittal until submittal has been reviewed and stamped by Architect.

1.2 SUBMITTAL SCHEDULE:

A. At least five days prior to date of pre-construction conference, submit a list of all required submittals, by specification section. Indicate timing for submission of required submittals and relation to construction sequence.

B. During course of the Work, maintain an updated submittal schedule showing status of all submittals. Provide copies for Architect's information at project meetings and at other times when requested.

1.3 ADMINISTRATIVE REQUIREMENTS:

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

B. Electronic submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal form for electronic submittals: Use form acceptable to Architect and Owner**,** containing the following information:
   a. Project name.
   b. Date.
   c. Name and address of Architect.
   d. Name of Construction Manager.
   e. Name of Contractor.
   f. Name of firm or entity that prepared submittal.
   g. Names of subcontractor, manufacturer, and supplier.
   h. Category and type of submittal.
   i. Submittal purpose and description.
   j. Specification Section number and title.
   k. Specification paragraph number or drawing designation and generic name for each of multiple items.
   l. Drawing number and detail references, as appropriate.
   m. Location(s) where product is to be installed, as appropriate.
   n. Related physical samples submitted directly.
   o. Indication of full or partial submittal.
   p. Transmittal number, numbered consecutively].
   q. Submittal and transmittal distribution record.
   r. Other necessary identification.
   s. Remarks.

C. Options: Identify options requiring selection by Architect.

D. Deviations: Identify deviations from the Contract Documents on submittals.

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.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES:

A. Electronic submittals:
1. Submit electronic submittals via email as PDF electronic files. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
2. When requested by Architect, post electronic submittals as PDF electronic files directly to Architect's FTP site specifically established for Project.

B. Product data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. Include product manufacturer's standard printed material, dated, with product description and installation instructions indicated. Product data may also contain test and performance data, illustrations and special details.
2. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as shop drawings, not as product data.
3. Mark each copy of each submittal to show which products and options are applicable.
4. 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.
5. For equipment, include the following in addition to the above, as applicable:
a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
6. Submit product data before or concurrent with samples.
7. Submit product data in the following format: PDF electronic file.

C. Shop drawings: Prepare project-specific information, drawn to scale. Do not base shop drawings on reproductions of Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction.

g. Seal and signature of professional engineer if specified.

2. Submit shop drawings in the following format: PDF electronic file.

D. Samples: Submit samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit samples that contain multiple, related components such as accessories together in one submittal package. For projects where electronic submittals are required, provide corresponding electronic submittal of sample transmittal, digital image file illustrating sample characteristics, and identification information for record.
2. Identification: Attach label on unexposed side of samples that includes the following:
   a. Generic description of sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable specification section.
   e. Specification paragraph number and generic name of each item.
3. 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.
4. Samples for initial selection: Submit manufacturer's color charts consisting of units or sections of units showing full range of colors, textures, and patterns available. Submit full sets 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.
5. 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.
   a. Number of samples: The number of samples submitted shall be the number required by Contractor, plus two which will be retained by Architect, unless otherwise indicated. Mark up and retain one returned sample set as a project record sample.
   b. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a sample, submit at least ** three ** sets of paired units that show approximate limits of variations.

E. 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. 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.

G. Installer certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in Contract Documents and, where required, is authorized by manufacturer for this specific project.

H. Manufacturer certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in Contract Documents. Include evidence of manufacturing experience where required.

I. Product certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in Contract Documents.

J. Material certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in Contract Documents.

K. 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 Contract Documents.

L. Product test reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in 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.

M. 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.

N. 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 Contract Documents.

O. 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.

P. 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 Contract Documents.

Q. Design data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW:

A. Action and informational submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Approval stamp: Stamp each submittal with a uniform, approval stamp. Include project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

C. Review for compliance with the Contract Documents, stamp with approval and submit to Architect shop drawings, product data, samples and similar submittals required by Contract Documents in accord with submittal schedule approved by Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in activities of Owner or of separate contractors.

D. By submitting shop drawings, product data, samples and similar submittals, Contractor represents to Owner and to Architect that Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements, and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with requirements of the Work and of the Contract Documents.

E. The Work shall be in accord with approved submittals except that Contractor shall not be relieved of responsibility for deviations from requirements of Contract Documents by Architect's review of shop drawings, product data, samples or similar submittals unless Contractor has specifically informed Architect in writing of such deviation at the time of submittal and (1) Architect has given written acceptance to the specific deviation as a minor change in the Work or (2) a Change order or Construction Change directive has been issued authorizing the deviation. Contractor shall not be relieved of responsibility for errors or omissions in shop drawings, product data, samples or similar submittals by Architect's review thereof.

F. Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data, samples or similar submittals, to revisions other than those requested by Architect on previous submittals. In the absence of such written notice, Architect’s approval of a resubmission shall not apply to such revisions.

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

H. Where work is indicated "By Others," Contractor shall indicate responsibility for providing and coordinating such work, whether by Subcontractors or under separate contracts.

I. Contractor agrees that submittals processed by Architect are not Construction Change Directives or Change Orders; that purpose of submittals by Contractor is to demonstrate that Contractor understands design concept; that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing fabrication and installation methods he intends to use.

J. Contractor represents by submitting samples, shop drawings and product data that he has complied with provisions herein specified. Submissions made without Contractor's approval indicated thereon will be returned without being reviewed for compliance with this requirement.

K. Perform no portion of the Work for which Contract Documents require submittal and review of shop drawings, product data, samples or similar submittals until the respective submittal has been reviewed by Architect. Such work shall be in accord with submittals bearing Architect's stamp.

3.2 ARCHITECT'S ACTION:

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
1. Architect's review, approval or other appropriate action is only for checking for conformance with information given and the design concept expressed in Contract Documents. Architect's acceptance of a specific item shall not indicate acceptance of an assembly in which the item is a component.
2. Architect's review of Contractor’s submittals shall not relieve Contractor of responsibility for deviation from requirements of Contract Documents unless Contractor has informed Architect in writing of such deviation at time of submission and Architect has given written acceptance to the specific deviation. Architect's review shall not relieve Contractor from responsibility for errors or omissions in submittals.
3. Informational sbmittals required to be submitted "For Architect's Information Only" are required to demonstrate that the Work complies with performance requirements of Contract Documents. Such submittals, if acceptable to Architect, will not be returned to Contractor.

B. Action submittals: Architect will review each submittal, mark it with appropriate action, corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

C. Informational submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements.

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

E. Submittals not required by Contract Documents may not be reviewed and may be discarded.

End of Section

SECTION 01 7329

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY:

A. Contractor's responsibilities:
1. Contractor shall be responsible for cutting, fitting and patching required to complete the work and as follows:
a. Make new and existing parts fit together.
b. Provide penetrations of existing structural, non-structural, mechanical and electrical elements and surfaces for installation of new materials and products. Provide shop drawings or other appropriate submittals for each structural penetration, as herein specified.
c. Restore penetrations of existing structural, non-structural, mechanical and electrical elements and surfaces in accord with accepted submittals. Restoration materials shall be similar to those removed or disturbed and/or materials and products as specified.
d. For structural, mechanical and electrical penetrations and disturbances, engage the services of a professional Engineer registered in the State of Georgia for all aspects of the work. Submittals shall bear the Engineer’s seal.
2. In addition to Contract requirements, upon written instructions of Architect:
a. Uncover work to provide for observation of covered work.
b. Remove samples of existing installed materials for testing and for matching of new materials.
c. Remove work to provide for alteration, restoration or refinishing of existing work.
3. Do not endanger work by cutting or altering work.
4. Do not cut or alter work not of this Contract without written consent of Owner.

B. Costs incurred for ill-timed work or uncovering of work shall include costs for services of Owner's consultants.

C. Related work specified elsewhere:
1. Temporary facilities and controls.
2. Product requirements.
3. Selective demolition.

1.2 SUBMITTALS:

A. Shop drawings, calculations, product data and samples:
1. Submit shop drawings, calculations, product data and samples for structural, mechanical and electrical penetrations and disturbances. Indicate existing conditions, extent of cutting and patching work required, and restoration of elements to accommodate new work. Include concrete mixes, structural steel and reinforcement, wiring, conduit, piping, ductwork, fixtures and other engineering elements required for completion of new work.
2. Submittals shall bear the seal of an Engineer licensed in the State of Georgia.

B. Cutting/patching request:
1. Submit a written request to Architect, well in advance of executing cutting or alteration, which affects the following and are not indicated on the drawings:
a. Work of Owner or any separate Contract.
b. Structural value or integrity of any element of project.
c. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
d. Efficiency, operational life, maintenance or safety of operational elements.
e. Visual qualities of sight-exposed elements.
2. Request shall include:
a. Identification of project.
b. Description of affected work.
c. Necessity of cutting or alteration.
d. Effect of work on Owner or separate Contract, or on structural or weatherproof integrity of project.
e. Description of proposed work:
1) Description of cutting, patching or alteration.
2) Trades who will execute the work.
3) Products proposed to be used.
4) Extent of work to be done.
f. Alternatives to cutting and patching.
g. Cost proposal, when applicable.
h. Written permission of separate Contractors whose work will be affected.
3. Should conditions of the work or the schedule indicate a change of products from the original installation, Contractor shall submit a request for substitution as specified in Product Substitution Procedures section.
4. Submit a written notice to Architect designating date and time work will be uncovered.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Materials for replacement of work removed: Materials shall be similar to those removed or disturbed and shall comply with specification sections for type of work to be performed.

B. Comply with requirements specified in other Sections.
1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Sustainable Design Requirements section.

C. 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 CUTTING AND PATCHING:

A. Pre-cutting and patching conference: Review cutting and patching work with Architect and affected subcontractors as a part of pre-construction conference and monthly progress meetings.

B. Examination:
1. Examine existing conditions of the project, including elements subject to damage or to movement during cutting and patching.
2. After uncovering work, inspect conditions affecting installation of products or performance of work.
3. Report unsatisfactory or questionable conditions to Architect in writing; do not proceed with work until Architect has provided further instructions.

C. Preparation:
1. Provide adequate temporary support to ensure the structural value or integrity of the affected portion of the work.
2. Provide devices and methods to protect other portions of the project from damage.
3. Provide protection from the elements for that portion of the project which may be exposed by cutting and patching work. Maintain excavations free from water.

D. Performance:
1. Execute cutting, patching and demolition by methods which will prevent damage to other work and will provide surfaces to receive installation of repairs.
2. Execute work by methods which will prevent settlement or damage to other work.
3. Elements of a structural or support nature, including concealed elements exposed by the removal of existing elements of the work, shall be inspected and the Architect notified should additional work be indicated due to loss of structural integrity, rot, rust, corrosion or other similar condition.
4. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
5. Restore work which has been cut or removed; install new products to provide complete work in accord with requirements of Contract Documents.
6. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces. Firestop penetrations through fire-rated construction as specified in Firestopping section.
7. Refinish entire surfaces (as necessary) to provide an even finish to match adjacent finishes:
   a. For continuous surfaces: Refinish to nearest intersection.
   b. For an assembly: Refinish the entire unit.
8. Repair damaged adjacent surfaces and finishes to original condition.
9. Maintain integrity of fire-resistant and rated construction.

E. Restoration:
1. Remove existing elements of a particular visual nature with care and in such manner that maximum reuse is possible. Label, clean, protect and store to ensure reusability or reinstallation, as applicable, to as near original condition as possible.

2. Existing items of significant visual or operational value to Owner, not planned for reinstallation, shall be made available for Owner's retention for use in other work.
3. Repairs of visual or finish materials requiring new material shall be made using materials which will match existing work in type, size, texture and all other visual aspects as approved by Architect.
4. Comply with the requirements of the Product Requirements section for delivery, storage, handling and installation of materials.
5. Restore penetrations of existing structural, non-structural, mechanical and electrical elements and surfaces in accord with accepted submittals. Restoration materials shall be similar to those removed or disturbed and/or materials and products as specified.
6. Finish surfaces requiring removal and repair, but designated to receive a new finish obscuring the nature of the original surface, may be repaired using materials most expedient to the nature of the work and which will result in a uniform, sound finished new surface of at least equal strength to existing adjacent material replaced. Subsurfaces to receive the new finish shall be of like nature to existing surrounding surfaces and acceptable to new finish surfacing installer for receipt of new materials without extra surface preparation for the repaired area.
7. Wiring, conduit, pipe or other utility service elements shall be enclosed or recessed within the building elements or surfaces as approved by Architect with associated material removal and restoration as described above. This shall include both new elements and existing surface-mounted elements to be retained within finished area.

End of Section

SECTION 01 7410

CLEANING UP

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS:

A. Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract.
   1. At completion of the work, remove waste materials, rubbish, tools, construction equipment, machinery and surplus materials from and about the Project.
   2. At the Date of Substantial Completion, turn over to Owner those tools, construction equipment, machinery and surplus materials specifically required by Contract Documents to be left for Owner's maintenance.

B. If Contractor fails to keep project clean or to clean up prior to Date of Substantial Completion, the Owner may do so as provided in the General Conditions, and the Owner shall be entitled to reimbursement from the Contractor.

1.2 STORAGE AND DISPOSAL REQUIREMENTS:

A. Combustible debris, rubbish and waste material:
   1. Provide adequate ventilation during use of volatile substances.
   2. Do not allow to accumulate within buildings or on project site.
   3. Store combustible debris, rubbish and waste material in covered metal containers. Remove from buildings and project site at end of each work period.
   4. Combustible debris, rubbish and waste material shall not be disposed of by burning on the project site.
   5. Comply with governmental and environmental regulatory requirements for disposal of combustible debris, rubbish and waste material.

B. Noncombustible debris, rubbish and waste material:
   1. Do not burn or bury noncombustible debris, rubbish and waste material on project site.
   2. Comply with governmental and environmental regulatory requirements for disposal of noncombustible debris, rubbish and waste material.

C. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains, on pavements, in gutters or on project site.

D. Do not dispose of waste or cleaning materials containing materials harmful to plant growth on project site. As quickly as possible, clean up materials which are accidentally spilled.

PART 2 - PRODUCTS

2.1 CLEANING AGENTS:

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

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

PART 3 - EXECUTION

3.1 CLEANUP DURING CONSTRUCTION:

A. Execute cleaning procedures to ensure that building, project site and adjacent properties are maintained free from debris and rubbish.

B. Wet down materials subject to blowing. Do not throw waste materials from heights.

C. Provide covered on-site containers for waste collection. Place all waste materials and rubbish in containers in an expeditious manner to prevent accumulation. Remove waste from project site when containers become full.

D. Legally dispose of all waste materials, rubbish, volatile materials and cleaning materials off project site.

E. Do not dispose of materials in waterways.

F. Prior to start of finish painting, clean and maintain interior spaces in a "broom clean" state until Date of Substantial Completion. Protect newly finished and clean surfaces from contamination during cleaning operations.

G. Do not allow accumulation of debris contributing to survival or spread of rodents, roaches or other pests.
1. On a daily basis, remove debris containing food scraps.
2. Contractor shall be responsible for securing services of a pest exterminator at no additional cost to the Owner.

3.2 FINAL CLEANING

A. General requirements:
1. Provide a level of cleanliness generally provided by commercial building maintenance organizations using commercial quality maintenance equipment and materials. Visually inspect finished surfaces and remove traces of soil, waste material, smudges, and other foreign matter. Remove paint droppings, spots, stains, and dirt from finished surfaces.
2. Clean all finished surfaces in accord with manufacturer's product data and requirements specified in trade sections, prior to Date of Substantial Completion. All general and specific cleaning shall be performed prior to Contractor's request that the project or portion thereof be inspected for Substantial Completion.
3. Remove dust, debris, oils, stains, fingerprints and labels from exposed interior and exterior finish surfaces, including glazing materials.
4. Repair, patch and touch up marred surfaces to match adjacent finishes. Replace materials which cannot be repaired or patched.
5. Clean disturbed areas of project site of debris:
   a. Broom-clean paved surfaces. Remove oil and similar deleterious substances.
   b. Remove debris from grassed and landscaped areas and from undisturbed areas.

6. Install cleaned or new filters if HVAC units were operated during construction period. Clean ducts, blowers and coils if units were operated without filters.
7. Clean surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces.
   a. To polished surfaces requiring routine application of buffed polish, apply polish as recommended by manufacturer of material being polished.
   b. Clean and polish finish hardware.
   c. Clean or replace filters of mechanical equipment.
8. Cleaning materials:
   a. Use materials which will not create hazards to health or property and which will not damage surfaces.
   b. Use materials and methods that are recommended by manufacturer or fabricator of material being cleaned.
9. Scheduling:
   a. Schedule final cleaning in such a manner so as to enable Owner to accept a completely clean project.
   b. Execute final cleaning prior to Substantial Completion.

B. Interior cleaning:
1. Remove temporary protection, tags, labels and markings from materials, fixtures, accessories and equipment.
2. Clean transparent and glossy materials to polished condition; remove foreign substances.
3. Wash and polish both sides of glass.
4. Polish reflective surfaces to clear shine.
5. Clean switch and outlet plates, finish hardware, handrails and metal trim of smudges, paint and soiling.
6. Clean aluminum, stainless steel, bronze and similar metals in compliance with instructions of metal manufacturer.
7. Vacuum clean carpeted and similar soft surfaces.
8. Clean resilient floors thoroughly with well-rinsed mop containing only enough moisture to remove surface dirt and dust; then buff dry by machine, bringing surfaces to sheen.
9. Clean tile in compliance with grout and tile manufacturer's recommendations.
10. Broom clean and vacuum concrete floors.
11. Clean under and behind convectors and other equipment.
12. Clean inside cabinets and other concealed areas.
13. Repaint surfaces and items that cannot be cleaned.
14. Clean equipment and fixtures to a sanitary condition.

C. Exterior cleaning:
1. Remove debris, waste and surplus materials from site and adjacent streets and roads.
2. Remove temporary protection and temporary construction.
3. Remove stains, spills and foreign substances from exterior surfaces.
4. Employ window-cleaning firm or personnel experienced in window cleaning work. Clean interior and exterior of all glazing.
5. Remove debris from roofs, gutters, downspouts, and drainage systems.
6. Rake lawn areas and clean grounds.
7. Sweep and hose down paving and walks.
8. Clean exterior materials according to product manufacturer's directions.

D. Cleaning mechanical and electrical equipment:
1. Clean surfaces of equipment; remove excess lubrication.
2. Clean plumbing fixtures to sanitary condition.

3. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers and coils when units have been operated without filters during construction.
4. Light fixtures and lamps:
   a. Wipe light fixtures with anodized aluminum louvers or reflectors free of dust, grease and fingerprints, using non-abrasive cloth and suitable cleaner, recommended by fixture manufacturer.
   b. Replace burnt-out bulbs with new specified bulbs.
   c. Replace construction bulbs with new specified bulbs.

E. Disposal operations:
1. Remove recycling, waste and surplus materials, rubbish, and construction facilities from Site.
2. Promptly and legally transport and dispose of any trash. Do not burn, bury, or otherwise dispose of trash on-site.
3. Refer to Construction Waste Management and Disposal section for specific and additional requirements.

End of Section

SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 DESCRIPTION:

A. Closeout includes general requirements in preparation for Final Completion and Final Payment. Closeout is directly related to Substantial Completion and may be a single time period for the entire work or a series of time periods for parts of the work accepted as substantially complete.

1.2 PREREQUISITES TO SUBSTANTIAL COMPLETION:

A. Prior to requesting Architect's certification of Substantial Completion, complete the following and list known exceptions.
   1. If Substantial Completion is being requested for a portion of the work, define such portion.
   2. Submit application for payment:
      a. Submit sworn statement indicating 100 percent completion of work claimed as "Substantially Complete".
      b. List incomplete items, value of incomplete work, and reasons for being incomplete.
      c. Include documentation for completion.
   3. Indicate accounting changes to Contract Sum.
   4. Submit for that portion of the work:
      a. Specific warranties.
      b. Workmanship/maintenance bonds.
      c. Maintenance agreements.
      d. Final certifications.
      e. Record drawings.
      f. Maintenance manuals.
      g. Project photographs, if pertinent to project activities.
      h. Damage or settlement survey.
   5. Obtain and submit releases enabling:
      a. Owner's use of the work.
      b. Access to services and utilities.
      c. Occupancy permits.
      d. Operating certificates.
   6. Advise Owner of pending insurance change-over requirements.
   7. Obtain and submit operating certificates, final inspection/test certificates, and similar releases enabling Owner's full and unrestricted use of the work and access to services and utilities.
   8. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.
   9. Make final change-over of locks and transmit keys to Owner, and advise Owner's personnel of change-over in security provisions. Tag each key to indicate which lock key operates. Accompany keys with final hardware schedule, as specified in Door Hardware section.
   10. Complete start-up testing of systems and instruction of Owner's operating/maintenance personnel.
   11. Touch-up and otherwise repair and restore marred exposed finishes.

B. Observation procedures:
   1. Upon receipt of Contractor's request, Architect will either proceed with observation or advise Contractor of prerequisites not fulfilled.

2. Following initial observation, Architect will either prepare Certificate of Substantial Completion or advise Contractor of work which must be performed prior to issuance of certificate.
3. Re-observe when requested and assured the work has been substantially completed. If Architect and/or his consultants are required to perform more than two re-observations, Contractor shall be responsible for payment of time and costs incurred by Architect and his consultants for further re-observations.
4. Results of completed observation will form initial "punch list" for final acceptance.

1.3 PREREQUISITES TO FINAL ACCEPTANCE:

A. General: Prior to requesting Architect's observation for certification of Final acceptance and Final payment, complete the following. List known exceptions.
1. Indicate accounting changes to Contract Sum.
2. Submit Final Application for Payment with:
   a. Final releases.
   b. Supporting documentation not previously submitted and accepted.
   c. Certificates of insurance for Products and Completed Operations where required.
3. Submit copy of Architect's Final Punch List. Contractor shall certify each item has been completed or resolved for acceptance.
4. Submit final meter readings for utilities.
5. Submit:
   a. Specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents not submitted at time of Substantial Completion.
   b. Record drawings and maintenance manuals not submitted at time of Substantial Completion.
6. Submit consent of surety.
7. Finishes manual:
   a. Assemble a manual bound in hard cover binders, presenting for Owner's guidance full details of finish materials used in the building including care and maintenance.
   b. Include a list of all finishes and their product names, numbers, colors, and cleaning and maintenance data. Include a list of installers and service representatives with company names and addresses, names of individual contacts, and telephone numbers.
   c. Submit documents in suitable transfer cases indexed and marked for each division of the work.
8. Submit executed contracts for extended maintenance or service required by Contract Documents to Architect for transfer to Owner.
9. Revise and submit evidence of final (continuing) requirements.
10. Complete final clean-up.
11. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
   a. Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.

B. Re-observance procedure:
1. Upon receipt of Contractor's Notice that the work has been completed, including punch list items and excepting incomplete items delayed because of acceptable circumstances, Architect will observe the work.
2. Upon completion of observation, Architect will either prepare certificates of Final Acceptance or advise Contractor of work not completed or obligations not fulfilled.

3. If necessary procedure will be repeated.

1.4 RECORD DOCUMENT SUBMITTALS:

A. General:
1. Unless otherwise required, furnish three complete sets of required documents.
2. Do not use required documents for construction purposes.
3. Protect from deterioration and loss in a secure fire resistive location.
4. Provide access to record documents.

B. Record drawings:
1. Maintain a blueline set of Contract Drawings and shop drawings in clean, undamaged condition.
2. Mark up variations in the work as originally shown.
3. Mark drawing most capable of showing field condition.
4. Where shop drawings are used for mark-up, cross reference with Contract Drawings.
5. Mark with red erasable pencil and, where feasible, use other colors to distinguish categories of work.
6. Mark up new information of importance not shown on Contract Drawings or shop drawings.
7. Record work covered by subsequent construction or requiring removal of finish material should maintenance be necessary.
8. Note related Change Order numbers where applicable.
9. Organize Record Drawing sheets into manageable sets. Identify each set.
10. At completion of project, provide the following:
a. One full set of reproducible prints marked and noted with all variations and revisions. Provide reproducibles and two additional sets of prints made from the marked-up reproducibles.
b. Electronic copy of scanned documents marked and noted with all variations and revisions. Provide in pdf format, on CDs.
c. Indicate prints and electronic copies of drawings as Record Drawings.

C. Record Project Manual:
1. Maintain one copy of Project Manual, including addenda, Change orders, and similar modifications.
2. Mark up variations occurring in actual work.
3. Record substitutions and selection of options.
4. Cross reference with other documents.
5. Where feasible, mark up variations on blank left-hand pages of Project Manual, opposite original text.

D. Record product data:
1. Maintain one copy of each Product Data Submittal.
2. Mark up significant variations in actual work. Include:
a. Variations in product as delivered to site.
b. Variations from manufacturer’s instructions and recommendations for installation.
3. Cross-reference with Change Orders and mark up Record Drawings and Specifications.

E. Record sample submittal: Immediately prior to Date(s) of Substantial Completion, Architect will meet with Contractor at site, and determine which, if any, samples to be transmitted to Owner. Comply with Architect's instructions for packaging, identification marking, and delivery to Owner's sample storage place. Dispose of other samples.

F. Maintenance and operating manuals:
1. Organize maintenance and operating information into sets of manageable size. Manuals divisions shall match organization and location of specification sections indicated in Project Manual.
2. Bind into heavy duty 3-ring binders, minimum 2" size, permanently identified and indexed with thumb tabs.
3. Include:
   a. Name of project, nature of information, Contractor/subcontractor and name and address of local parts supplier and service organization.
   b. Emergency instructions.
   c. Spare parts listing.
   d. Warranties.
   e. Wiring diagrams.
   f. Recommend turn-around cycles.
   g. Inspection procedures.
   h. Applicable shop drawings.
   i. Applicable product data.

G. Miscellaneous record submittals:
1. Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with performance of the work.
2. Immediately prior to Date(s) of Substantial Completion:
   a. Complete miscellaneous records and place in good order.
   b. Identify and bind or file.
   c. make ready for continued use and reference.

H. Inspection reports: Submit certificates from applicable local governmental agencies indicating that construction has been inspected as required by laws or ordinances and that project is approved for occupancy.

I. Warranties: In accord with Contract Conditions, provide warranties as follows:
1. Contractor shall furnish his warranty in writing.
2. Forward each installer's warranty, in writing, on form bound herein.
3. Forward manufacturers' and installers' warranties as specified in individual specification sections.
4. Unless specifically indicated otherwise in individual sections, period for warranties shall begin on Date of Substantial Completion and shall continue for one year.
5. Warranties shall state Date of Substantial Completion and date on which warranty expires.
6. Assemble, bind, label and transmit warranties as required for other manuals above.

J. Keys: Deliver at Date of Substantial Completion. Tag each key to indicate lock which key operates. Accompany keys with final hardware schedule, as specified in Finish Hardware Schedule.

1.5 OPERATING/MAINTENANCE INSTRUCTIONS AND DEMONSTRATIONS:

A. Coordinate demonstrations and trial operations of equipment for Owner's designated personnel, and complete such demonstrations prior to Date of Final Acceptance. Each installer of work requiring maintenance or operation shall:
   1. Meet with Owner's personnel, at project site to provide basic instructions needed for proper operation and maintenance of the entire work.
   2. Provide instructions by manufacturer's representatives as required.
   3. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuels, identification materials, control sequences, hazards, cleaning and similar procedures and facilities.
   4. Demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, and similar operations.
   5. Review maintenance and operations in relation to warranties and similar continuing commitments.

B. Demonstration and training video recordings: Submit on high resolution CDs or DVDs.
   1. Submit two copies within seven days of end of each training module.
   2. 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.

1.6 CONTINUING INSPECTIONS:

A. Comply with Owner's request to participate in inspections at end of each time period required by specific warranties or similar components. Participate in general inspection of the work one year following Date of Substantial Completion.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

End of Section

SECTION 02 4119

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS:

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

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

1.2 SUMMARY:

A. Work included in this section:
1. Removal of existing work to accommodate remodeling, renovation and restoration, as indicated on drawings.
2. Protection of existing finished surfaces.
3. Removal, storage, cleaning, restoration and reinstallation of existing items indicated to be reused in the finished work.
4. Cleaning and restoration of existing work to remain.

B. Related work specified elsewhere:
1. Cutting and patching.
2. Interior finishes.
3. Doors and frames.
4. Gypsum board.
5. Acoustical ceilings.
6. Masonry.
7. Mechanical.
8. Electrical.

1.3 SUBMITTALS:

A. Calculations: Provide the services of a Structural Engineer licensed in the State of the project to recommend procedures to be used in the alteration or removal of any structural members not included in detail on drawings. Submit calculations and drawings sealed by engineer.

B. Execution plan: Submit plan of execution for Owner's approval. Indicate locations of barricades, dust and noise enclosures and protective coverings. Indicate use of areas outside the work limits, including corridors, lobbies, elevators, loading areas and public thoroughfares. Indicate phasing of the work. Submit phasing plan as marked up bond prints.

C. Obtain acceptance of Owner's property insurance carrier and roofing system warrantor (if any) for proposed work involving existing building prior to start of work.

1.4 QUALITY ASSURANCE:

A. Pre-demolition conference: Prior to beginning demolition work, a pre-demolition conference will be held to review work to be accomplished and to inventory existing conditions.
   1. Contractor, Architect, Owner and related subcontractors involved in demolition work will be present.
   2. Contractor shall notify Architect and Owner at least seven days prior to time of conference.
   3. Demolition work and inventory of existing equipment, existing damages to work to remain and items to be removed shall be reviewed at conference.
   4. Contractor shall make list of inventoried items to be removed, reused or stored.
   5. Contractor shall take minutes of meeting and distribute minutes and copies of list to all participants.

B. Mock-ups:
   1. Prior to beginning final work, perform a test for repair, refinishing and cleaning of each surface for Architect's review. If unacceptable to Architect, re-test methods and materials until approval is obtained. Perform test mock-ups in least conspicuous areas.
   2. Perform a test for Architect's review for each of the following finish surfaces:
      a. Wood paneling.
      b. Carpeting.
      c. Resilient flooring and base.
      d. Finish carpentry.
      e. Wood doors.
      f. Marble work.
      g. Wall coverings.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Schedule use of loading areas with Owner.

B. Store materials to be retained or reused in locations acceptable to Owner.

C. Maintain neat, clean conditions in storage areas; remove rags and waste materials at end of each day's work.

1.6 PROJECT/SITE CONDITIONS:

A. During demolition operations, should suspect asbestos or asbestos-containing materials, or other material listed as a hazardous material by the Environmental Protection Agency be discovered, notify Architect and Owner and discontinue that portion of the work until further instructed.

B. Drawings indicating existing building conditions are available from Owner for general information only. Owner assumes no responsibility for the actual condition of structures to be demolished. Conditions existing at the time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, variations within the structure may occur by Owner's removal and salvage operations prior to the start of the demolition work.

C. The use of explosives will not be permitted.

D. Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks and adjacent facilities.

E. Do not close or obstruct streets or walks without permission from authorities having jurisdiction. Provide flagman where public thoroughfares are used for debris removal. Maintain thoroughfares free of dirt and debris caused by demolition or hauling operations.

F. Conduct demolition operations to minimize disruption or interference with building occupants and operation, and the use of building facilities not included in the work. Coordinate phasing of work with Owner.

G. Protect portions of existing building indicated to remain. Repair or replace portions of building damaged by this work, at no additional cost.

H. Provide temporary enclosures or other methods to limit dust transmission to adjacent areas. Provide temporary weatherproof enclosures for portions of work exposed to weather. Provide temporary noise reduction barriers to separate work areas from adjacent occupied areas.

I. Maintain building security. Equip doors with locks. Secure construction area during non-working hours.

J. Where removal or alteration of concealed structural members is required, which are not included in detail on drawings, notify Architect and await instructions prior to proceeding.

K. Provide temporary fire protection devices and construction when removing or relocating existing fire doors or barriers. Install permanent fire protective construction to close voids and penetrations as work progresses, as specified in Firestopping section. Coordinate with local building officials and Owner's insurance carrier.

L. Provide temporary protective walkways or covering on existing finish floor surfaces to protect floor finishes. Provide plywood walkways on finish floors where machinery is moved or operated.

M. Maintain or re-establish existing bench marks.

N. Limit exterior dust by sprinkling or other acceptable methods.

PART 2 - PRODUCTS

2.1 PROTECTIVE COVERS:

A. Partitions and dust protective coverings:
1. Provide non-combustible panels, flame-resistant tarpaulins or approved materials of equivalent fire-retardant characteristics. Polyethylene sheet and other plastic films shall be reinforced, fire-resistive sheet, minimum 10 mil thickness, with a flame spread rating of 15 or less, meeting ASTM E84-15 and passing NFPA 701, Test Method 2.
2. Provide equivalent fire-resistive tape for sealing joints.

B. Protective covering for floors:
1. Non-asphaltic, non-waxed, non-staining, reinforced kraft paper.
2. Minimum 1/2" thickness plywood or composition board for walkways.

C. Barricade and corner guard material:
1. Utility grade lumber.
2. Plywood.

2.2 REMOVED MATERIAL:

A. The following items shall require possible removal, cleaning, restoration and reinstallation, or replacement, as required by demolition of flooring materials and job conditions:
1. Entrance door thresholds and recessed floor closer devices.
2. Kitchen equipment at STEM lab Building,

B. Reuse of material: Reuse of any items involved in the work is subject to Contractor's ability to remove, store and reinstall the item without permanently damaging or marring the items to be reused. If Contractor is unable to reuse any item as prescribed herein, he shall substitute new material to match existing in lieu of reusing same. Contractor may also elect to use new material to match existing in lieu of reuse of existing for his own convenience.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Examination: Visit project site and compare locations of equipment, electrical and mechanical work with indications in Contract Documents. Report discrepancies discovered for resolution.

B. Scheduling and phasing:
1. Comply with approved execution plan for scheduling and phasing of the work.
2. Coordinate disconnect or disruption of electrical and mechanical services with Owner.

C. Establish level and line benchmarks on adjacent buildings prior to start of demolition work.

D. Comply with governing regulations pertaining to environmental protection. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding and pollution.

E. Erect and maintain temporary ditches, barriers, straw bale dams or skirts to prevent surface water from carrying debris beyond contract limits, onto adjacent properties or into storm drainage system.

F. Plant protection:
1. Cover, barricade or otherwise protect foliage of plants or trees designated to remain.
2. Rinse dust from foliage and maintain plants watered during operations.
3. Prevent spillage of demolition runoff or solutions of harmful liquids on root systems of plants or trees.
4. Replace, at no cost to Owner, landscape items damaged by demolition operations.

G. Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations, as directed by Architect or governing authorities. Return adjacent areas to condition existing prior to the start of the work.

3.2 DEMOLITION:

A. Disconnect and seal off abandoned utilities and utilities to be removed prior to start of demolition. Utilities shall be disconnected below existing grade level or outside of contract limits by representatives of public utility being disconnected. Maintain utility service to facilities in use.

B. Interior demolition:
1. Remove interior construction and finishes as required for new construction and to limits indicated on drawings.
2. Resilient floor coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

C. Remove existing mechanical and electrical equipment, including plumbing fixtures and piping, as indicated and required to complete work.

D. Remove existing materials and finishes to limits indicated without damage to substrates or adjacent surfaces.

E. Where work is to be cut or removed to accommodate new work, form neat, uniform and smooth edges or terminations.

F. Proceed with demolition in accord with approved schedule.
1. Demolish concrete and concrete unit masonry in small sections.
2. Remove structural framing members and lower to ground by means of hoists, derricks or other suitable methods.
3. Locate demolition equipment throughout the structure and remove materials so as not to impose excessive loads to supporting walls, floors or framing.
4. Where new construction connects to existing, Contractor shall provide and maintain temporary partitioning until removal is directed by Architect. Contractor shall execute new construction to maximum extent possible before breakthrough to existing, and shall advise Owner in writing of the intended breakthrough and the demolition methods to be used. Contractor shall schedule the work to provide minimum shutdown of the operations of Owner.

G. Provide all necessary shoring and bracing to maintain structural integrity of the building during demolition operations. Remove only after new structure is in place and capable of supporting braced or shored parts.

H. During demolition, protect adjoining work from damage. Observe and monitor adjacent structural elements. Stop work and notify Architect for instructions if changes are noted. Cracks or structural damage resulting from demolition shall be repaired at no expense to Owner and to Architect's satisfaction.

I. Prepare an itemized list of material or equipment for reuse or storage. List quantities, condition and location. Submit copies to Owner within seven days of removal of item.

J. Except for items designated to be removed and reused in the work or items retained by Owner for storage, all material resulting from this work shall become property of Contractor and shall be promptly removed from site. Storage or sale of removed materials will not be permitted on project site or within building.

K. Resilient floor coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

L. Materials resulting from demolition become the property of Contractor except as follows:
1. Equipment belonging to utility or public service companies unless abandoned by such companies.
2. Hidden valuable items, buried items and property of third persons.
3. Salvaged equipment and materials noted for reuse.
4. Other items indicated or otherwise identified by Owner or Architect.

3.3 DISPOSAL OF DEMOLISHED MATERIALS:

A. Remove debris, rubbish and other materials resulting from demolition operations from the project site. Do not stockpile debris on project site.

B. Removal of debris from interior demolition shall be through unoccupied spaces and corridors, with removal through occupied spaces or corridors only upon specific permission by Owner.

C. Burning of removed materials from demolished structures will not be permitted on the project site.

D. Transport materials removed from demolished structures and dispose of off project site.

E. Chute and load debris and materials within confines of existing open spaces on project site. Chuting and loading in streets surrounding site is prohibited when such operations can be executed on project site. Immediately remove debris or materials that fall onto streets or walks surrounding site.

3.4 REPAIR WORK:

A. Repair dents, cracks, scratches and holes in existing finishes to remain as part of the finished work.

B. Repair wood doors, wood paneling, finish carpentry using putty, and stain matching color of existing work.

C. Ceiling suspension system:
1. Replace damaged ceiling components.

End of Section

SECTION 03 8215

CONCRETE CORING AND LEVELING

PART 1 - GENERAL

1.1 SUMMARY:

A. Work of this section includes filling and transition tapering and feather edging of existing interior subfloor surfaces to provide substrates meeting requirements specified and suitable to receive finish floor materials.

B. Related work:
1. Cutting and patching.
2. Selective demolition.
3. Tiling.
4. Resilient flooring.

1.2 SUBMITTALS:

A. Shop drawings: Submit shop drawings indicating coring locations and sizes, subfloor elevations and degree of corrective work required for filling, leveling and transitioning. Make drawings on copies of floor plans taken from the drawings. Indicate spot elevations of existing substrates and relate, plus or minus, to required elevations for each floor. Indicate the maximum depth of the fill and transition material and type of proposed material.

B. Product data: Submit manufacturer's printed product data for floor filling and transitioning compounds. Indicate methods of mixing and application for depths proposed for the work, and requirements for subsurface preparation.

C. Certification: Submit certification of compatibility between filling and transitioning compounds and finish flooring materials to be adhered to floor surfaces.

1.3 QUALITY ASSURANCE:

A. Applicable standards; standards of the following as referenced herein:
1. ASTM International (ASTM).
2. Factory Mutual (FM).

B. Manufacturer's qualifications:
1. Manufacturer of floor filling and transitioning compounds shall submit evidence of formulating and marketing such products for a period of not less than five years. Manufacturer shall submit similar evidence of satisfactory completion of work of similar scope using the products submitted for this project.
2. Manufacturer shall provide technical personnel for on-site inspection and recommendations for material usage and surface preparation.

C. Installer qualification: Installer shall be a firm regularly engaged in the filling and transitioning of existing concrete floor surfaces. Installer shall have not less than five years experience and shall submit evidence of satisfactory completion of work of similar scope. Installer shall be trained and approved by materials manufacturer.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials in original unopened containers displaying product name, type, grade and mixing instructions.

B. Store materials in dry, covered storage, off ground.

C. Store flammable materials in dry, cool storage area, away from fire, flame or source of ignition.

1.5 PROJECT/SITE CONDITIONS:

A. Comply with manufacturer's printed product data regarding environmental conditions for floor compounds.

B. Protect adjacent materials from compounds. Remove displaced materials.

PART 2 - PRODUCTS

2.1 CEMENTITIOUS FILLING, LEVELING AND TRANSITIONING COMPOUND:

A. Acceptable products:
1. Ardex, Inc., Ardex K-15 Premium Self-Leveling Underlayment.
2. Bonsal/ProSpec, Inc., ProSpec Level Set 300 Underlayment.
3. Dayton Superior, LeveLayer Premium Self-Leveling Underlayment.
4. Mapei Corp., Ultraplan 1 Plus.

B. Characteristics:
1. Type: High strength, fast-setting, non-shrink cementitious underlayment.
2. Thickness: As indicated; from feather-edge to 1-1/2" without aggregate; to 5" with aggregate.
3. Aggregate for fill over 1-1/2" thick: As recommended by fill material manufacturer.
4. Compressive strength: Minimum 4100 psi at 28 days in accord with ASTM C109-13.
5. Flexural strength: Minimum 1,000 psi at 28 days when tested in accord with ASTM C348-14.
6. Flammability: Class A when tested in accord with ASTM E84-15.
7. Primers and additives: As recommended by fill material manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Examination and verification:
1. Examine existing interior subfloor surfaces for conditions affecting the work. Coordinate observation with requirements of finish floor materials specified as part of the work.
2. Employ engineering instruments to determine levelness and irregularities of surfaces.
3. Take spot elevations throughout each floor to determine overall levelness of floors.
4. Take additional readings to accurately determine size, location and depth or height of area to receive corrective work.
5. Relate readings to required elevations for each floor and record on shop drawings.

B. Preparation:
1. Prepare substrates to receive manufactured floor filling and transitioning compounds in accord with manufacturer's product data submitted to and approved by Architect.
2. Clean substrates of adhesives, oil, grease, loose or foreign materials and substrates which would impair bond.
3. Prior to installing any fill or transition materials, provide temporary dams to prevent liquid materials from migrating through floors or onto adjacent construction.
4. Contractor shall cut or grind minor protrusions and offsets in the structural slab which will not adversely affect the structural performance of the slab. Proposed cutting or grinding areas shall be identified on layout plan and shall be approved prior to performing the work.
5. Do not remove or grind existing floor finishes suspected containing asbestos. Notify Architect and Owner of conditions and do not proceed prior to receipt of further instructions.

3.2 FILLING AND TRANSITIONING:

A. Prime floor surfaces to receive filling and transitioning compound as required by manufacturer’s product data.

B. Mix and apply filling and transitioning compounds in accord with manufacturer's product data. Perform filling to bring existing concrete floor substrate to tolerance of ±1/8" in 10'-0", free of voids, holes and irregularities which would adversely affect finish flooring. Bring surfaces to elevations indicated on drawings.

C. Install transition material to provide featheredge, extended tapers or slopes as indicated on drawings and elevations. Slopes and tapers shall be installed to tolerance of ±1/8" in 10'-0" smoothness.

D. Achieve finish elevations and tolerances indicated. Utilize compounds for full thicknesses of fills and transitions encountered. Provide screeds to achieve finished elevations.

3.3 FIELD TESTING:

A. Take sample cubes of fill compound for testing during initial installation, in accord with manufacturer's instructions. Samples shall be tested for specified compressive strength in accord with ASTM C472-99(2014).

3.4 PROTECTION:

A. Do not allow traffic in pour areas for a minimum of three days after application.

B. Protect cured compound from heavy or wheeled loads during remainder of construction period with overlayment of wood planks or 1/2" thickness plywood. Keep installation clean until applications of floor finish materials.

End of Section

SECTION 05 5000

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUBMITTALS:

A. Shop drawings: Indicate sizes, shapes, fabrication and installation details for metal fabrications. Indicate anchorage to adjacent surfaces. Indicate shop finish. Where shop primer is required, indicate exact product used.

B. Product data: Submit for manufactured items. Indicate materials, construction, finishes and installation instructions.

C. Welder certification: Submit welders' qualifications in accord with AWS D1.1 and AWS D1.2, current within the previous 6 months, for Architect's information only.

D. Research/evaluation reports: For post-installed anchors, from ICC-ES.

1.2 QUALITY ASSURANCE:

A. Applicable standards:
1. American Institute of Steel Construction (AISC), "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings".
2. American Iron and Steel Institute (AISI), standards as referenced herein.
3. American Welding Society (AWS):
   a. AWS D1.1, "Structural Welding Code -- Steel."
   b. AWS D1.2, "Structural Welding Code -- Aluminum."
   c. AWS B2.1, "Welding Procedure and Performance Qualification."
4. ASTM International (ASTM), standards as referenced herein.
5. Society for Protective Coatings (SSPC), standards as referenced herein.

B. Qualifications of welders:
1. Welders employed on the work shall have passed qualification tests and shall be current within the past 6 months in the position for which employed, in accord with AWS D1.1 procedures.
2. Contractor shall require any welder to retake the qualification test when, in Architect’s opinion, welder's work creates a reasonable doubt as to the welder’s proficiency. Requalification tests shall be conducted at no additional expense to Owner. Recertification shall be made to Architect after welder has passed the retest.

C. Field measurements: Take field measurements prior to preparation of shop drawings and fabrication, to ensure fitting of work.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS:

A. Materials shall be free from defects impairing strength, durability or appearance. Exposed surfaces throughout project shall have the same inherent texture and color for like locations.

B. Fasteners: Fasteners and anchors shall be non-corrosive, non-staining and concealed, except as indicated on approved shop drawings. Exposed fasteners shall be of same materials, color and finish as material to which applied, shall be countersunk and finished flush.

2.2 BASIC MATERIALS:

A. Structural steel shapes: Meeting ASTM A36-14.

B. Hot-rolled carbon steel sheets and strips: Meeting ASTM A568-14 and ASTM A1011-14; Grade 40, minimum.

C. Cold-rolled carbon steel sheets: Meeting ASTM A1008-13, Grade 40, Type 2, minimum.

D. Structural steel plate: Meeting ASTM A36-14, 3/16" thickness.

E. Other steel: Mild steel.

2.3 PRIMER PAINTS AND COATINGS:

A. Primer paint for surfaces to receive finish painting: Compatible with required finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Painting and Coating section.

B. Primer paint for components which do not receive further finish and components to be embedded into concrete: Organic zinc-rich primer meeting SSPC-Paint 20, Type II.

C. Bituminous paint: Cold-applied asphalt emulsion complying with ASTM D1187-97(2011).

D. Cold galvanizing compound: Pre-mixed, zinc dust and organic binders formulated specifically for use on steel surfaces. Compounds shall have concentrations of zinc dust in the range of 65% to 69% or above 92% in the dried film in accord with ASTM A780-09.

2.4 MISCELLANEOUS CONSTRUCTION:

A. Provide items indicated or required to complete the work, including but not limited to the following:
   1. Lintels and shelf angles:
      a. Exterior: Hot dip galvanized steel.
      b. Interior: Mild steel.
   2. Anchors:
      a. Exterior: Hot dip galvanized steel.
      b. Interior: Mild steel.
   3. Hanger rods not provided by other trades: In size and length indicated or required; threaded full length or at ends.
   4. Counter support brackets, welded construction.

B. Finish on miscellaneous items: Prime paint, unless otherwise specified.

2.5 FABRICATION:

A. Form work true to line and level with accurate angles and surfaces and straight, sharp edges. Ease exposed edges to radius of approximately 1/32". Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

B. Weld corners and seams continuous and in accord with AWS specifications. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces and without weakening base metal. Remove slag from welds before applying shop primer.

C. Formed components: Molded, bent or shaped members shall be formed with clean, sharp arrises, without dents, scratches, cracks and other defects.

D. Provide anchorage of type shown on approved shop drawings, coordinated with supporting structure.

E. Fabrication tolerances: Machine fabricated and shop assembled mechanical joints shall fit within ±1/32". Sizes of each element of an assembly shall be correct within 1/8"; total size of a freestanding assembly shall be correct within 1/2".

2.6 PROTECTIVE COATINGS:

A. Shop primer: Ferrous metal, except galvanized surfaces, shall be cleaned and given one shop coat of shop primer as specified herein:
   1. Surface preparation: Clean surfaces after fabrication and immediately prior to shop painting in accord with SSPC-SP 3, Power Tool Cleaning or SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning.
   2. Shop priming:
      a. Shop prime steel components.
      b. Shop prime surfaces after completion of fabrication.
      c. Apply specified shop primer in accord with manufacturer's product data and SSPC Painting Systems Specifications to provide a dry film thickness of 2.5 mils.
      d. Coat fabrications and anchors to be built into masonry construction using bituminous paint, 15 mils dry film thickness.
      e. Apply shop primer within four hours after cleaning and before rust-bloom occurs. Paint only in relative humidity below 85 percent and surface temperatures of five degrees F. above dew point.
      f. Where galvanized or zinc-coated metal is specified, metal shall not be shop primed.

B. Galvanizing:
   1. Hot dip galvanizing applied to products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips or zinc coatings on assembled steel products shall comply with ASTM A123-13, Grade 65.
   2. Hot dip galvanizing applied to products fabricated from steel sheet shall comply with ASTM A653-13, coating Designation G90.
   3. Hot dip galvanizing shall be done after fabrication.
   4. Preparation: Prior to galvanizing, remove dirt, scale, rust, oil, grease and similar debris, including residue resulting from welding and fabrication, by pickling or blasting. Clean, flux and dry materials prior to galvanizing.
   5. Following galvanizing, remove roughness, dross, blisters, lumps and runs. Immediately coat bare steel with cold galvanizing compound.
   6. Following galvanizing, surfaces to be painted shall be chemically treated for bond in accord with ASTM D6386-10.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Inserts and anchorages: Furnish inserts and anchoring devices which must be set in concrete for installation of work.

B. Coordination: Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete construction.

C. Shop assembly: Preassemble items in shop to greatest extent practicable to minimize assembly at project site. Disassemble units only to extent necessary for shipping and handling limitations. Mark units for reassembly.

D. Where galvanized components must be field welded to supports, remove galvanizing prior to welding.

3.2 INSTALLATION:

A. Fastening to in-place construction: Provide anchorage devices and fasteners to secure to in-place construction; including threaded fasteners for concrete inserts, toggle bolts and through-bolts.

B. Cutting, fitting and placement: Perform cutting, drilling and fitting to install work. Set work in location, alignment and elevation, plumb and level, true and free of rack, measured from established lines and levels. Install work in accord with approved shop drawings.

C. Fitting: Fit exposed connections to form hairline joints. Field weld connections which cannot be shop welded. Grind joints smooth.

D. Field painting: For surfaces indicated to receive field paint, prepare and paint in accord with the requirements of the Painting and Coating section.

E. Allowable tolerances: Field assembled mechanical joints shall fit within ±1/32". Install freestanding items to ±1/4" of proper position.

3.3 REPAIR:

A. Repair of galvanized surfaces: After installation, clean surfaces from which galvanizing was removed during installation in accord with SSPC-SP 3, Power Tool Cleaning. Coat surfaces with cold galvanizing compound in accord with ASTM A780-09 to achieve a minimum 3.0 mils dry film thickness.

B. Repair of primed surfaces: After installation, clean damaged areas in shop primer to the same standards as required for the shop coat and paint using identical primer.

End of Section

SECTION 05 5100

METAL STAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This Section specifies prefabricated metal stairs and railings.

1.2 REFERENCES

A. Reference Standards
1. ASTM International (ASTM):
a. ASTM A36 Standard Specification for Carbon Structural Steel.
b. ASTM A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
c. ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
d. ASTM A513 Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
e. ASTM A786 Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
f. ASTM A1008 Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
g. ASTM A1011 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

2. American Welding Society (AWS):
a. AWS D1.1 Structural Welding Code - Steel.
b. AWS D1.3 Structural Welding Code - Sheet Steel.

3. American National Standards Institute (ANSI):
a. ANSI A117.1 Accessible and Usable Buildings and Facilities Standards.
4. The Society for Protective Coatings (SSPC):
a. SSPC-SP3 Power Tool Cleaning.

1.3 SUBMITTALS

A. General: Submit listed submittals in accordance with Submittal Procedures Section.

B. Product Data: Submit specified products as follows:
   1. Manufacturer's product data.
   2. Manufacturer's installation instructions.

C. Shop Drawings: Indicate information on shop drawings as follows:
   1. Stair plans, elevations, details, methods of installation and anchoring.
      a. Show members, sizes and thickness, anchorage locations and accessory items.
      b. Furnish setting diagrams for anchorage installation as required.
      c. Include calculations stamped by a structural engineer registered in the jurisdiction in which the project is located.

D. Samples: Submit as follows:
   1. Two samples, minimum size 6 inches (152 mm) square, representing actual product, finish and patterns for each finished tread product specified.

1.4 INFORMATION SUBMITTALS

A. General: Submit listed submittals in accordance with Submittal Procedures Section.

B. Manufacturer's Instructions: Submit manufacturer's storage and installation instructions.

C. Source Quality Control: Submit documentation verifying that components and materials specified in this Section are from single manufacturer.

D. Qualification Statements:
   1. Submit certificate verification that manufacturer is American Institute of Steel Construction (AISC) Certified for Standard Steel Building Structures.
   2. Submit letter of verification for Installer's Qualifications.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer:
      a. American Institute of Steel Construction (AISC) Certified firm having 10 years experience manufacturing components similar to or exceeding requirements specified in scope of project.

b. Having sufficient capacity to produce and deliver required materials without causing delay in work.

2. Installer: Acceptable to manufacturer.

1.6 DELIVERY, STORAGE & HANDLING

A. Delivery and Acceptance Requirements:
1. Deliver material in accordance with Section [01 61 00 - Common Product Requirements] and in accordance with manufacturer's written instructions.
2. Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.

B. Storage and Handling Requirements:
1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

PART 2 - PRODUCTS

2.1 METAL STAIRS

A. Acceptable manufacturers:
1. FS Industries – Providence, R.I. or equal
2. Panel Built, Inc.- Blairsville, GA. or equal
3. Sharon Stairs, a division of Duvinage, LLC or equal

B. Design Criteria:
1. Structural Performance of Stairs: Stairs shall withstand the following structural loads without exceeding the allowable design working stress of materials, including anchors and connections. Apply each load to produce the maximum stress in each component:
a. Treads and Platforms of Metal Stairs: Capable of withstanding a uniform load of 100 psf (4.8 kN/m^2) and concentrated load of 300 lbf (1.33 kN) applied on an area of 4 square inches (2581 square mm). Concentrated and uniform loads need not be assumed to act concurrently.
b. Stair Framing: Capable of withstanding stresses resulting from loads specified, in addition to stresses resulting from railing system loads.
c. Limit Deflection of Treads, Platforms and Framing Members: To L/240.

2. Structural Performance of Handrails and Railings: Handrails and railings shall withstand the following structural loads without exceeding the allowable design working stress of materials, including handrails, railings, anchors and connections.
   a. Top Rail of Guardrail: Capable of withstanding a concentrated load of 200 lbf (0.89 kN) applied in any direction and a uniform load of 50 psf (2.39 kN/m^2) applied in any direction. Concentrated and uniform loads need not be assumed to act concurrently.

C. Standard Stair and Rail System:
   1. Manufacturer's standard prefabricated, pre-engineered straight run stair and landing system, consisting of hot rolled steel sheet stringers, risers, treads, landings, fasteners/supports and railings.
      a. Stringers:
         1) Steel plate or channel with side mounted prefabricated railings.
         2) Minimum thickness or gage as determined by structural design calculations, structural grade steel plate or channel.
   2. Risers: Closed riser, minimum 14 gage (1.9 mm) hot rolled mild steel sheet, sloped maximum 1 1/2 inches (38.1 mm) and conforming to Americans with Disabilities Act (ADA) nosing requirements.
   3. Treads: Manufacturer's standard concrete pan system, field poured. Tread pans to be minimum of 14 gage (1.9 mm), or as determined by design calculations. Pan depth 1 1/2 inches (38.1 mm). Exposed welds from the bottom side of flight assemblies will not be allowed. All welds to be from topside of tread pans as recommended by manufacturer.
   4. Mid Landings: Minimum of 12 gage (2.7 mm) hot-rolled mild steel sheets, formed for a minimum 2 1/2 inches (64 mm) concrete fill, with 11 gage channel supports and bracing welded to perimeter frame at 12 inches (305 mm) on center.
   5. Fasteners and Supports: Sized by the manufacturer to meet structural design criteria. If hanger rod connections are applicable to any of the landing connections, they shall be a minimum of 5/8 inch (15.9 mm) diameter steel rod, with actual size based on stair load.
   6. Manufacturer's standard welded steel tube railing system complying with the following requirements:
      a. Rails: 1 1/2 inches (38.1 mm) diameter × 13 gage (2.3 mm) minimum round steel tube, continuous multi-strand type, equally spaced with not more than 3 15/16 inches (100 mm) clearance between strands and with a minimum extension per code at top and bottom risers. Wrap rail continuously past space between flights to form guardrail as required by building code. Terminate rail ends with radiused returns, newel posts or safety

terminations approved by local code. Provide not less than 1 1/2 inches (38.1 mm) clearing between rail and wall.

b. Rail Posts: 1 1/2 inches (38.1 mm) square × 11 gage (3 mm) tubing. Rail posts to fasten to side of plate stringers per manufacturer's shop drawings. Manufacturer to pre-weld erection aid to rail post for proper height to aid stair erector. Erection aid (setting block) to be removed and weld-ground smooth after installation.

c. Fabrication:
   1) Use preformed or prefabricated bends.
   2) Butt weld tee and cross intersections in tubing. Cope and weld intersections in pipe. Miter elbows.
   3) Mechanically fasten internal sleeves and fittings.
   4) Provide minimum 12 gage (2.7 mm) welded steel plate closures or hemispherical closure fittings on all exposed rail ends.

D. Materials:
1. Steel Shapes and Plates: To ASTM A36.
2. Steel Pipe: To ASTM A53 Type E or S, Grade B.
3. Steel Tubing:
   a. Structural Use: To ASTM A500, Grade B or C.
   b. Non-Structural Use: To ASTM A513, hot rolled or coiled rolled (mill option).
4. Steel Sheet:
   a. Structural Use: To ASTM A1011 (hot rolled).
   b. Non-Structural Use: To ASTM A786, ASTM A1008.
5. Fasteners: As recommended by manufacturer.
6. Welding Rods: In accordance with AWS code and AWS filler metal specifications for material being welded.
7. Primer: HAPS-free, solvent-based, rust inhibitive primer containing less than 3.5 lb/gal (1.6 kg/L) Volatile Organic Compounds (VOC) and compatible with conventional alkyds topcoats.

E. Fabrication:
1. Use same material and finish as parts being joined. Use stainless steel between dissimilar metals and non-corrosive fasteners at exterior connections or joints.
2. Provide fasteners of sufficient strength to support connected members and loads, and to develop full strength of parts fastened or connected.
3. Construct stairs and rails with all components necessary for support and anchorage, and for a complete installation.

F. Finishes:
1. Mill finish.

2.2 ACCESSORIES

A. Anchor bolts, clip angles, hanger rods, hardware and incidental materials required for complete installation, as recommended by the manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that conditions of substrates previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to metal stair and railing installation.
1. Inform Owner and Architect of unacceptable conditions immediately upon discovery.
2. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Owner.

3.2 PREPARATION

A. Ensure structure or substrate is adequate to support metal stairs and railings.

B. Remove existing asphalt as required and provide concrete foundations at bearing points.

3.2 INSTALLATION

A. Coordinate metal stairs and railings work with work of other trades for proper time and sequence to avoid construction delays.

B. Install stairs, landings and handrails in accordance with manufacturer's instructions. Install square, plumb, straight and true to line and level, with neatly fitted joints and intersections.
1. Do not cut or alter structural components without written authorization.
2. Field welding and joining shall conform to AWS D1.1 and AWS D1.3.
3. Grind all exposed welds smooth and touch-up shop-primed areas with same primer as used by Manufacturer.

3.3 ADJUSTING

A. Adjust components and systems for correct function and operation in accordance with manufacturer's written instructions.

3.4 CLEANING

A. Perform cleanup in accordance with Section 01 7410 Cleaning Up.

B. Upon completion, remove surplus materials, rubbish, tools and equipment.

END OF SECTION

SECTION 06 1000

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work specified elsewhere:
1. Architectural woodwork.
2. Gypsum board.

1.2 SUBMITTALS:

A. Preservative-treated wood certification: Submit for Architect's information only. Submit certification by treating plant, stating chemicals and process used, net amount of salts retained, conformance with applicable standards and moisture content after treatment.

B. Fire-retardant treatment certification: Submit for Architect's information only. Submit certification by treating plant that fire-retardant treatment materials comply with governing ordinances and that treatment will not bleed through finished surfaces.

1.3 QUALITY ASSURANCE:

A. Applicable standards:
1. ASTM International (ASTM), standards as referenced herein.
2. Wood products; comply with the following standards published by the U. S. Department of Commerce, National Institute for Standards Technology (NIST):
a. Lumber: PS 20-10.
b. Construction and Industrial Plywood: PS 1-95.
3. Preservative-treated wood: American Wood Protection Association (AWPA); current standards, as referenced herein, shall apply to preservative-treated wood products.
4. Plywood: APA The Engineered Wood Association (APA), current standards.
5. Grading rules; current grading rules of the following associations apply as applicable to wood products:
a. Southern Pine Inspection Bureau (SPIB).
b. Western Wood Products Association (WWPA).
c. West Coast Lumber Inspection Bureau (WCLIB).
d. National Lumber Grades Authority (NLGA).

B. Design standards; spans, connections and design criteria for members not otherwise indicated shall comply with the following:
1. American Forest and Paper Association (AF&PA).
a. "National Design Specifications for Wood Construction".
b. "Design Values for Joists and Rafters".
c. "Span Tables for Joists and Rafters".

C. Product identification:
1. Lumber: Lumber shall bear the grade stamp of a listed grading rules association certified by the Board of Review of the American Lumber Standards Committee (ALSC), identifying species or species combination, grade, moisture condition at time of surfacing, mill of origin and grading agency.

2. Plywood: Plywood shall bear the stamp of the APA The Engineered Wood Association (APA), indicating type, grade, thickness, exposure durability, span rating, agency compliance, species group, edging, finish and glue type.
3. Preservative-treated wood products: Preservative-treated lumber and plywood shall bear the quality standard stamp of the applicator, indicating preservative type, exposure conditions, year of treatment, treatment plant and treatment supervising agency.
4. Fire-retardant-treated wood products: Fire-retardant-treated lumber and plywood shall bear the stamp of Underwriters Laboratories, Inc., (UL) or other approved independent inspection agency, indicating treatment type or name, flame spread and treatment plant.

D. Engineered Wood Products:
1. Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
2. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Upon delivery to project site, place materials in areas protected from weather.

B. Store materials a minimum of 6" above ground on blocking and cover with waterproof covering. Provide for air circulation and ventilation.

C. Store no seasoned materials in wet or damp portions of building.

D. Protect sheet materials from breaking corners and damaging surfaces.

PART 2 - PRODUCTS

2.1 LUMBER:

A. Species and standards: Grade-stamped commercial softwood conforming to PS 20 and referenced grading rules, unless otherwise indicated.

B. Seasoning: 19% maximum moisture content at time of building enclosure, unless otherwise noted.

C. Surfacing: Surfaced four sides (S4S).

D. Dimensions: Indicated lumber dimensions are nominal. Comply with PS 20.

E. Plates, blocking, bracing and nailers: Utility Grade or #3 Southern Pine.

2.2 TREATED WOOD PRODUCTS:

A. Pressure-preservative-treated wood:
1. Treatment type: Water-borne preservative registered with EPA.

2. AWPA standard:
   a. Lumber, timber and plywood shall conform to applicable requirements of AWPA Standard U1-07 and T1-07 for species, product and end use.
   b. Handling and care of pressure treated wood products shall conform to AWPA Standard M4-06.
   c. Preservatives shall conform to AWPA P5-07.
3. Preservative retention: As required by treatment type in accord with AWPA Standards for below- or above-ground use.
4. Seasoning; re-dry after treatment to 19% maximum moisture content.
5. Use:
   a. Wood products in contact with concrete slabs-on-grade or foundations.
   b. Nailers or blocking cast or built into concrete or masonry.
   c. Wood products in contact with exterior walls.
   d. Blocking, nailers, plates and similar wood products in conjunction with roof decks, roofing and roof parapets.

B. Interior fire-retardant-treated wood:
1. Acceptable product; subject to compliance with specified requirements:
   a. Hickson Corporation, Dricon.
   b. Hoover Treated Wood Products, Pyro-Guard.
   c. Viance, LLC, D-Blaze.
2. Description: Pressure-impregnated with a chemical retardant tested and listed by Underwriters Laboratories, Inc., (UL). When tested in accord with ASTM E84-15 treated products shall have a flame spread of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional twenty minute period. In addition, flame front shall not progress more than 10'-6" beyond centerline of burners at any time during test.
3. Surface burning characteristics: F.R.-S rating in accord with Underwriters Laboratories, Inc. (UL).
4. AWPA standard: AWPA U1-07, T1-07 and P17-02.
5. Seasoning; kiln-dried after treatment to the following maximum moisture content:
   a. Lumber: 19%.
   b. Plywood: 15%.
6. Hygroscopicity: Maximum 28% equilibrium moisture content when tested in accord with ASTM D3201-13 at 92% relative humidity.
7. Use: As required by codes.

2.3 HARDWARE:

A. Power-driven fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

B. Post-installed anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

C. Provide nails, bolts, nuts, washers, screws, expansion bolts, clips, powder-actuated fasteners and similar hardware necessary for complete installation of rough carpentry items.
1. Material and finish of fasteners in contact with non-pressure treated and fire-retardant-treated components shall be G90 hot dip galvanized steel or Type 304 stainless steel, except nails shall be hot dip galvanized.

2. Material and finish of fasteners in contact with pressure-preservative-treated components shall be one of the following:
   a. G185 hot-dip galvanized steel.
   b. Type 316L stainless steel.

2.4 ADHESIVES:

A. Adhesives for gluing furring and sleepers to concrete or masonry: Formulation complying with ASTM D3498-03(2011) that is approved for use indicated by adhesive manufacturer.
   1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL:

A. Install wood framing and rough carpentry work cut square on bearings, fitted and set to required lines and levels, and secured in place.

B. Lay out the work to provide correct openings to receive work of other trades.

C. Framing with engineered wood products: Install engineered wood products in accord with manufacturer's product data.

D. Preservative-treated wood:
   1. Prior to installation, brush-apply preservative to cut edges and ends of wood, using same type of preservative used for pressure treatment.
   2. Handle and install in accord with AWPA standards.

E. Fire-retardant-treated wood:
   1. Prevent exposure to water or moisture, and do not use if so exposed.
   2. Only end cuts shall be made. Do not rip or re-surface.
   3. Attach using only hot dip galvanized nails and anchors.

F. Plates, blocking, nailers and miscellaneous framing:
   1. Provide 2" nominal thickness members to support and secure finishing materials, fixtures, accessories, partitions, specialty items and trim.
   2. Bolt to structural steel or metal framing at 4'-0" o. c., maximum.
   3. Secure to concrete and masonry using cast-in bolts, powder-activated stud, sleeve or wedge type anchors spaced at 4'-0" o. c., maximum.
   4. Provide anchors within 3" of ends of members.
   5. Provide linear runs in maximum practicable lengths, with joints in multiple members offset 3'-0", minimum.
   6. Around roof perimeter and at roof penetrations, provide blocking equal to roof insulation thickness. Attach through decking into structural members at 2'-0" o. c., maximum, starting within 3" of each end. Space ends 1/2" for venting.
   7. Install furring vertically at 2'-0" o. c., maximum. Secure to concrete or masonry with adhesive and appropriate fasteners spaced at 2'-0" o. c., maximum.

G. Attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
   2. ICC-ES evaluation report for fastener.

H. Site tolerances:
   1. Variation from plumb: 1/4" in 10'-0" height, non-cumulative,
   2. Variation from horizontal squaring diagonals: 1/2".
   3. Variation from indicated location of framing: ± 1/4".
   4. Location of dimensioned openings: ± 3/8".
   5. Variation from indicated rough opening size: +1/4", -1/8".

End of Section

SECTION 06 4000

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY:

A. Work of this section includes factory-fabricated woodwork including plastic laminate finished millwork.

B. Related work:
1. Rough carpentry.
2. Solid surfacing fabrications.

1.2 SUBMITTALS:

A. Shop drawings: Submit for architectural woodwork. Indicate construction and installation details, species and grades of materials, finishes, plastic laminate and cabinet hardware selections.

B. Product data: Submit for cabinet hardware and similar manufactured items. Submit with shop drawings.

C. Samples for verification:
1. Plastic laminates, 8 by 10 inches, for each type, color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.
2. Wood-grain plastic laminates, 12 by 24 inches, for each type, pattern and surface finish, with one sample applied to core material and specified edge material applied to one edge.
3. Thermoset decorative panels, 8 by 10 inches, for each color, pattern, and surface finish, with edge banding on one edge.
4. Hardware items: Submit if requested by Architect. Samples will be returned to supplier.

1.3 QUALITY ASSURANCE:

A. Applicable standards; comply with the following:
1. Standards of the following, as referenced herein:
a. American National Standards Institute (ANSI).
b. APA The Engineered Wood Association (APA).
c. ASTM International (ASTM).
d. American Wood Protection Association (AWPA).
e. Hardwood Plywood and Veneer Association (HPVA).
f. National Electric Manufacturers Association (NEMA).
2. Wood products; standards of the U. S. Department of Commerce, National Institute of Standards and Testing:
a. Lumber: PS 20-10.
b. Construction and Industrial Plywood: PS 1-95.
3. Standards for architectural woodwork: Architectural Woodwork Institute (AWI/AWS), "Architectural Woodwork Standards, 2nd Edition, October 1, 2014, herein referred to as AWS Standards. Work shall comply with applicable portions of AWS standards.

B. Grade marks: Identify lumber and plywood by official grade mark.
   1. Lumber: Grade stamp shall contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
   2. Plywood: Appropriate grade trademark of the APA. Indicate type, grade, class, identification index and inspection and testing agency mark.
   3. On components to be exposed to view, grade marks shall be located so as to be concealed in finished work.

C. Fabricator/installer qualifications:
   1. Architectural woodwork shall be fabricated and installed by a single manufacturer.
   2. Fabricator/installer shall have at least five years successful experience in the fabrication, finishing and installation of architectural woodwork of the type and quantity required and, if requested by Architect, shall submit evidence of such experience.

D. Pre-installation conference:
   1. Prior to beginning work, a pre-installation conference will be held to review work to be accomplished.
   2. Contractor, fabricator/installer and Architect shall be present.
   3. Contractor's submittals will be reviewed.
   4. Substrates and conditions under which woodwork shall be installed will be reviewed.
   5. Contractor shall notify all parties at least seven days prior to time of conference.
   6. Contractor shall record minutes of meeting and distribute to all parties in attendance.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Deliver no woodwork to project site until areas are ready for woodwork installation.

B. Immediately upon delivery to job site, place woodwork indoors, protected from weather.

C. Store woodwork a minimum of 6" above floor on blocking and cover with waterproof covering. Provide for air circulation and ventilation. Store in dry, conditioned space.

D. Wrap prefinished woodwork in protective covering for shipping and storage. Protect from sunlight exposure.

1.5 PROJECT CONDITIONS:

A. Field measurements: Take field measurements to ascertain exact woodwork sizes. Indicate exact dimensions on shop drawings.

B. Install no interior woodwork until spaces are enclosed, dry and conditioned. Maintain temperature between 55 degrees F. and 80 degrees F. for 72 hours before beginning installation and afterwards until Date of Substantial Completion.

C. Maintain interior relative humidity at the site between 25% and 55% before, during, and after installation.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS:

A. Lumber for opaque finish:
1. Species: Poplar.
2. Lumber grade: Grade II.
3. Moisture content: 8-13%.
4. Locations: As indicated on drawings.

B. Veneer-faced hardwood plywood:
1. Meeting HPVA HP-1. Plywood shall be made without urea-formaldehyde adhesive.
2. Plywood shall conform to AWS Section 4 Standards for millwork grade specified.
3. Plywood shall be APA A-A, A-B or A-D, Exposure 1 Grade, Group 1; "A" face for exposed surfaces, "B" face for semi-exposed surfaces, "D" face for unexposed surfaces.

C. Medium-density fiberboard (MDF):
1. Acceptable manufacturers:
a. Flakeboard Co., South Carolina and Oregon.
b. SierraPine, Oregon.
c. Clarion Boards, Inc., Pennsylvania.
d. Temple-Inland Forest Products Corp., Pennsylvania.
e. Unilin US, North Carolina.
2. Characteristics: Meeting ANSI A208.2; Grade 130, minimum 40 pcf density; moisture-resistant. MDF shall have no added urea-formaldehyde resins.

D. Hardboard: AHA A135.4, 1/4" thickness, tempered.

E. Plastic laminates:
1. Acceptable products:
a. Formica Corp., Formica.
b. Panolam Industries International, Inc., Nevamar.
c. Wilsonart International, Inc., Wilsonart.
2. Conforming to NEMA Standard LD3-2005, as follows:
a. Horizontal applications: Grade HGL.
b. Vertical applications: Grade VGL.
c. Cabinet-liner: Grade CL-20.
d. Backing sheet: Grade BKL, undecorated plastic laminate.
e. Post-forming applications: Grade HGP.
f. Chemical resistant applications: Grade VGP.
g. Fire-resistant applications: Grade VGF.
h. Solid color applications: Grade HGS.
3. Colors, textures and patterns: As selected by Architect from laminate manufacturer's standard full line selection.
4. Provide abuse-resistant laminates for exposed portions of the work.

F. Thermoset decorative panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semi-exposed edges.
2. Color, gloss, texture and pattern as selected by Architect from manufacturer’s standard color selection.
3. Location: Cabinet interiors.

G. Composite wood products: Products shall be made without urea formaldehyde.

2.2 ARCHITECTURAL CABINETS:

A. Plastic laminate clad cabinets:
1. AWS quality grade: Custom.
2. Panel core: Particleboard or hardwood plywood.
3. Finish on exposed surfaces: Plastic laminate as specified herein.
4. Finish on semi-exposed surfaces: Thermoset decorative panels:
5. Component edges: Plastic laminate faced.

B. Tops:
1. Plastic laminate:
a. AWS quality grade; Custom.
b. Core: Medium density fiberboard.
c. Non-exposed surface: Backing sheet.
2. Solid surfacing: See Solid Surfacing Fabrications section.

2.3 MISCELLANEOUS WOODWORK:

A. Comply with AWS Standards as follows:
1. Standing and running trim: Section 6, Custom Grade.
2. Shelving: Section 6, Custom Grade.

2.4 HARDWARE:

A. Door and drawer pulls:
1. Acceptable products:
a. Epco, Inc., #MC-402/2-4.
b. Sugatsune America, Inc., #SST-30M.
c. Stanley Works #4484, 4" long.
2. Type: 4" long wire pull, satin stainless steel finish.

B. Concealed hinges:
1. Acceptable products:
a. Grass America, Inc., #3903.
b. Julius Blum, Inc., #71.6500 Series.
c. Sugatsune America, Inc., #H160-C.
2. Type: 165 degree opening, self-closing.

C. Recessed shelf standards and supports:
1. Acceptable manufacturers:
a. Basis of design: Knape and Vogt Mfg. Co., #255 standard with #256 support.
b. Stanley Works.
c. Johnson Hardware, Inc.
d. Sugatsune America, Inc.
e. Hafele America Co.
2. Type: Steel.
3. Finish: Finish as selected by Architect.

D. Surface-mounted shelf standards and supports:
1. Acceptable manufacturers:
a. Basis of design: Knape & Vogt Mfg. Co., #80 standards with #180 brackets.
b. Capitol Hardware. Inc.
c. Garcy Corp.
d. Stanley Works.

e. Johnson Hardware, Inc.
2. Type: Steel.
3. Finish: Finish as selected by Architect.

E. Heavy-duty shelf standards and supports:
1. Acceptable manufacturers:
a. Basis of design: Knape and Vogt Mfg. Co., #87 Heavy-Duty Standard with #186/187 Heavy-Duty Brackets.
b. Stanley Works.
c. Johnson Hardware, Inc.
d. Sugatsune America, Inc.
e. Hafele America Co.
2. Type: Steel, heavy-duty applications.
3. Finish: Finish as selected by Architect.

F. Side mount drawer slides:
1. Acceptable products:
a. Basis of design: Accuride, #3832.
b. Grant Hardware Co., #5632.
c. Knape and Vogt Mfg. Co., #1429.
2. Type: Full extension, steel ball bearing.
3. Capacity: 100 lb. capacity:

G. Cabinet drawer/door lock:
1. Acceptable products:
a. Knape and Vogt Mfg. Co., #986.
b. Sugatsune America, Inc., #3310.
c. Timberline Supply, Ltd., Style CB-230 deadlock and Type 230 cylinder body with lock plug.
2. Finish: Nickel-plated.

H. Wire management grommet:
1. Acceptable products:
a. Outwater Plastics, Inc., #31-2".
b. Sugatsune America, Inc., #V60-B.
c. Hafele America, Inc.
2. Provide set including grommet, grommet cap and slot cover; color as selected by Architect from manufacturer's standard selection.

I. Fasteners: Provide bolts, nails, screws, toggle bolts and similar fasteners as indicated or required to attach and secure work.
1. Fasteners for trim shall be finishing nails for attachment to wood framing, trim-head screws for attachment to metal framing.
2. Material and finish of fasteners in contact with non-pressure treated and fire-retardant-treated components shall be G90 hot dip galvanized steel or Type 304 stainless steel, except nails shall be hot dip galvanized.
3. Material and finish of fasteners in contact with pressure-treated components shall be G185 hot-dip galvanized steel or Type 316L stainless steel.

2.6 ADHESIVES:

A. Adhesives: Do not use adhesives that contain urea formaldehyde.

B. Adhesive for bonding plastic laminate: Unpigmented contact cement.

C. Adhesive for bonding edges: Hot-melt adhesive or adhesive specified above for faces.

2.7 FABRICATION:

A. General:
1. Quality grade for architectural woodwork shall be AWS Custom Grade.
2. Fabricate architectural woodwork in accord with approved shop drawings.
3. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
4. Seal faces and edges of medium density fiberboard indicated to be sealed or finished.
5. Perform veneer operations using hot press method using moisture-resistant, fire-retardant adhesives.
6. Shop-assemble for delivery to site in units easily handled and to permit passage through building openings. Items which cannot be manufactured in one piece shall have joints at logical breaking points and shall be so noted on shop drawings.
7. Apply plastic laminate sheets in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.
8. Cap exposed plastic laminate finish edges with material of same finish and pattern.
9. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
10. Scribe, miter and accurately join members.
11. Finish work shall be smooth, free from abrasion, tool marks, open joints or raised grain on exposed surfaces.

B. Casework:
1. Fit shelves, doors and exposed edges with plastic laminate edging. Use one piece for full length only.
2. Where countertops can not be provided in single length, join using compression type fasteners.
3. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, fixtures and fittings. Verify locations of cutouts from onsite dimensions. Seal contact surfaces of cut edges.

C. Standing and running trim:
1. Shop prepare and identify components for grain matching during site erection.
2. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for searching and site cutting.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Prior to pre-installation conference, examine substrates and conditions to receive work. Check that floors and wall substrates are level, plumb and within tolerances to receive work specified in this section.

B. Verify mechanical, electrical and building items affecting work of this section are placed and ready to receive architectural woodwork.

C. Do not begin work until unsatisfactory substrates or conditions have been corrected.

3.2 GENERAL WORKMANSHIP:

A. Install woodwork in a manner consistent with the specified Quality Grade, plumb, level, true and straight within 1/8" in 10'-0". Shim as required using concealed shims.

B. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing.
1. Use fixture attachments in concealed locations for wall mounted components.
2. Secure cabinet and counter base to floor using angles and anchorages.

C. Scribe and cut for accurate fit to other finished work, with maximum gap of 1/32". Do not use addition overlay trim to conceal larger gaps.

D. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.

E. Before making cutouts, drill pilot holes at corners.

F. Finish work shall be smooth, free from abrasion, tool marks, raised grain grade markings or similar defects on exposed surfaces.

G. Distribute defects allowed in the quality grade specified to the best overall advantage when installing job assembled work. Install work in accord with approved shop drawings.

H. Touch up mill finished items, including refinishing necessitated by job fitting or attaching and repair of scratches and similar damages. Touch up repairs shall be indiscernible in the finished work.

3.3 INSTALLATION OF STANDING AND RUNNING TRIM:

A. Trim and moldings: Install in single unjointed lengths for openings and for runs less than 10'-0". For longer runs, use only one piece less than 10'-0" in straight runs with no piece being less than 4'-0" in length. Join lengths with beveled butt joints. Stagger joints in adjacent members. Cope at returns and miter at corners.

B. Attach and secure in place with uniform joints providing for thermal and building movements.

C. Attachment: Blind anchor where possible. Use finishing nails or trim-head screws where exposed. Set exposed heads for filling. Secure work to framing, anchors or blocking which is built in or directly attached to structural elements.

3.4 FIELD FINISHING:

A. Field finish: Field finish painted woodwork in accord with the requirements of the Painting and Coating section. Prior to finishing, sand using 120 to 180 grit abrasive on a smooth sanding block, to remove scuff and handling marks, raised grain, scratches and effects of moisture exposure.

3.5 CLEANING AND PROTECTION:

A. Protect finished and prefinished surfaces from work of other trades.

B. Prior to Date of Substantial Completion, examine work for damages. Repair or replace such damaged work to original condition.

C. Clean wood, metal and accessory items using a neutral cleaner. Check and correct operating mechanism for proper operation. Adjust and lubricate hinges, catches and other operating hardware.

End of Section

SECTION 07 6200

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY:

A. Work of this section includes:
1. Formed roof-drainage sheet metal fabrications.
2. Formed low-slope roof sheet metal fabrications.
3. Formed wall sheet metal fabrications.
4. Manufactured reglets with counterflashing.

B. Related work specified elsewhere:
1. Roofing system.
2. Joint sealants.
3. Flexible flashing.

1.2 PERFORMANCE REQUIREMENTS:

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet metal standard for flashing and trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature change: 120 deg F, ambient; 180 deg F, material surfaces.

1.3 SUBMITTALS:

A. Shop drawings: Indicate material types, sizes, shapes, thicknesses, finishes, fabrication details, anchors, connections, expansion joints and relation to adjacent work. Details and profiles shall be drawn at full scale.

B. Product data: Indicate product description, finishes and installation instructions for manufactured products, including interface with adjacent materials and surfaces.

C. Samples; submit as follows:
1. Special finishes: 6" by 6" samples for Architect's color selection.

D. Submittals schedule: Obtain Architect’s acceptance of submittals prior to pre-roofing conference.

1.4 QUALITY ASSURANCE:

A. Applicable standards as referenced herein:
1. Aluminum Association (AA), "Aluminum Sheet Metal Work in Building Construction".
2. American Architectural Manufacturers Association (AAMA).
3. American National Standard Institute/Single Ply Roofing Institute (ANSI/SPRI), as referenced herein.
4. ASTM International (ASTM).
5. National Roofing Contractors Association (NRCA): "The NRCA Roofing Manual: Membrane Roof Systems-2011".
6. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), "Architectural Sheet Metal Manual," Seventh Edition - January, 2012.
7. Society for Protective Coatings (SSPC), standards as referenced herein.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Store materials off ground, under cover. Protect from damage and deterioration.

B. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Damaged material shall be rejected and removed from site.

1.6 WARRANTIES:

A. Warrant sheet metal flashing and trim work to be free of defects in materials and workmanship. Warranty period shall be two years beginning at Date of Substantial Completion. Combine warranty with roofing warranty.

B. Finish warranty: Warrant fluoropolymer coating to remain free of checking, crazing, peeling, chalking or fading for a period of twenty years, beginning at Date of Substantial Completion.

C. Warranty periods shall begin at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS:

A. Aluminum: 3003-H14 alloy, meeting ASTM B209-14.
1. Gutters,: Material thickness shall meet SMACNA Manual Table 1-5 requirements, minimum 0.040" thickness, fluoropolymer finish.
3. Downspouts: Material thickness shall meet SMACNA Manual Table 1-9 requirements, minimum 0.032" thickness, finish to match gutters.
4. Gutter brackets: Material thickness shall meet SMACNA Manual Table 1-8 size requirements, minimum 1/4" thickness by 1" wide, finish to match gutters.
5. Downspout hangers: 0.051" thickness, finish to match downspouts.
6. Splash pans: 0.063" thickness, mill finish.
7. Miscellaneous sheet metal flashing and trim: 0.032" thickness, mill finish.

B. Roofing cement/mastic: As recommended by roof membrane manufacturer.

C. Fasteners: Stainless steel.
1. Nails: Flat head, needle point, not less than 12 ga. and of sufficient length to penetrate substrate 1" minimum.
2. Expansion shields: Lead or bronze sleeves.

3. Screws: Self-tapping type, with round heads.
4. Bolts: Furnished complete with nuts and washers.
5. Rivets: Round head, solid type.
6. Blind clips and cleats: Same gauge as sheet metal.

D. Silicone sealant for concealed joints:
1. Acceptable products:
a. Dow Corning Corp., #795.
b. Pecora Corp., #895.
c. Tremco, Inc., an RPM Company, SpecTrem 2.
2. Type: One-part silicone rubber; meeting ASTM C920-14a, Type S, Grade NS, Class 25.

E. Bituminous paint: Cold-applied asphalt emulsion for separation of dissimilar materials: Complying with ASTM D1187-97(2011), minimum 30 mils thickness.

2.2 FINISHES:

A. Fluoropolymer coating finish:
1. Two coat, shop-applied, baked-on fluoropolymer coating system based on minimum 70% Arkema Group, Kynar 500 or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605-05.
2. Color: as selected by Architect from manufacturer’s full range.
3. Finish on unexposed surfaces: Mill finish.
4. Work to receive fluoropolymer coating includes sheet metal flashing and trim exposed to view from building elevations.

2.3 SHEET METAL FABRICATION:

A. Fabricate sheet metal work in accord with approved shop drawings and applicable standards. Form sheet metal work with clear, sharp and uniform arrises. Hem exposed edges. Form curved components to radius indicated on the drawings, without deformation in metal.

B. In aluminum sheets less than 0.040" thick, make joints using flatlock seams, 3/4" in width. Fill seams with exterior sealant. Make joints in thicker sheets using seaming or by Tungsten Arc Welding (TIG) or Gas Metal Arc Welding (MIG) processes, using appropriate filler alloy.

C. Provide linear sheet metal items in 10'-0" to 12'-0" sections, except as otherwise noted. Form flashing using single pieces for the full width. Provide shop-fabricated, one-piece corners and transition pieces, with maximum 2'-0" long legs.

D. Make riveted joints using solid shank rivets or pop rivets as applicable. Pop rivets shall be closed end type.

E. SMACNA Manual fabrication requirements:
1. Gutters: Figure 1-2, Style A. Size gutters in accord with Tables 1-1, 1-2, 1-3 and 1-4, and Charts 1-1 and 1-2.
2. Downspouts: Figure 1-32B. Size downspouts in accord with Tables 1-1, 1-2, 1-3 and 1-4, and Charts 1-1 and 1-2.

PART 3 - EXECUTION

3.1 SHEET METAL INSTALLATION:

A. Install work in accord with approved shop drawings and applicable standards. Sheet metal items shall be true to line, without buckling, creasing, warp or wind in finished surfaces.

B. Coordinate flashing at roof surfaces with roofing work to provide weathertight condition at roof terminations.

C. Perform field joining of lengths as specified for shop fabrication.

D. Isolate dissimilar materials to prevent electrolysis. Separate using bituminous paint.

E. Seaming: Form seams in direction of flow. Aluminum seams shall be filled with exterior sealant. Lap seams occurring in members sloping 45° or more than 4", minimum; bed in flashing cement.

F. Secure sheet metal items using continuous cleats, clips and fasteners as indicated. Perform no exposed face fastening.

G. Fastening:
1. Nails: Confine to one edge only of flashing 1'-0" or less in width. Space nails at 4" o. c., maximum. Provide neoprene washers for nails.
2. Cleats: Continuous, formed to profile of item being secured.
3. Clips: Minimum 2" wide by 3" long, formed to profile of item being secured. Space at 2'-0" o. c., maximum.

H. Joints:
1. Form joints in linear sheet metal to allow for 1/2" minimum expansion at 12'-0" o. c., maximum, and maximum 2'-0" from corners.
2. Form plates to profile of sheet metal item.
3. Install 1'-0" wide backup plate centered under joint. Set sheet metal over backup plate in two beads of specified silicone sealant, 1/4" in diameter, minimum.
4. For units with top width of 12" and wider, install 6" cover plate centered over joint. Set in two beads of specified silicone sealant, 1/4" in diameter, minimum.
5. Mate components for positive seal. Do not allow sealant to migrate onto exposed surfaces.

I. Where sheet metal is indicated as flashing above and below heads of doors, windows and other penetrations, extend flashing minimum 8" beyond opening, each side. Turn ends up minimum 2" to form end dams and to ensure drainage through weeps and not into cavity.

J. Install perimeter metal cap flashing in 10'-0" lengths with backup plates at joints.
1. Secure perimeter metal cap flashing in ** saw cut ** reglet ** with lead wedges installed at 2'-0" o. c., maximum. Hammer wedges to a depth which will not interfere with sealant or backer rod. Place wedge at each length so that wedges are within 8" of joint, without interfering with splice plates.
2. Install sealant in accord with Joint Sealants section, to form fillet bead minimizing holding of water.

3. Construct with riveted and seal joints, lapped 1", minimum, in direction of flow. Provide 3/4" minimum expansion joints at 30'-0" o. c., maximum. Form expansion joints in accord with SMACNA Manual, Figure 1-7, butt type.
4. Hang gutters with high points equidistant from downspouts, evenly sloped toward downspouts. Support gutters in accord with SMACNA Manual, Figure 1-16 for heavy gutters at low-slope roofs.
5. Secure downspouts to exterior walls at 6'-0" o. c., maximum, using straps and expansion type fasteners in accord with SMACNA Manual, Figure 1-35C. Lap downspout joints 1-1/2", minimum, and seal.
6. Where downspouts empty onto lower roof surfaces, provide splash pan in accord with SMACNA Manual, Figure 1-36; secure splash pan in adhesive, prior to spreading roof aggregate.

End of Section

SECTION 07 8400

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work:
1. Concrete.
2. Mortar and grout.
3. Brick masonry.
4. Concrete unit masonry.
5. Structural steel.
6. Metal decking.
7. Metal fabrications.
8. Rough carpentry.
9. Thermal insulation.
10. Fireproofing.
11. Joint sealants.
12. Gypsum board.
13. Fire protection specialties.
14. Mechanical.
15. Plumbing.
16. Electrical.

1.2 SYSTEM PERFORMANCE REQUIREMENTS:

A. Penetration firestopping: 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. Penetrations in fire-resistance-rated walls: Determine penetration firestopping ratings in accord with ASTM E814-13a or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
a. F-rating: Not less than the fire-resistance rating of constructions penetrated.
2. Penetrations in horizontal assemblies: Determine penetration firestopping ratings in accord with ASTM E814-13a or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
a. F-rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
b. T-rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
3. Exposed penetration firestopping: Products shall have flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84-13a.
4. Penetrations in smoke barriers: Determine penetration firestopping ratings in accord with UL 1479.
a. L-rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at 0.30-inch wg at both ambient and elevated temperatures.

B. Fire-resistive joint systems: Where required, fire-resistive joint systems shall resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
   1. Joints in or between fire-resistance-rated construction: Determine fire-resistive ratings by ASTM E1966-14a or UL 2079. Rating shall be equal to or exceed fire-resistance rating of construction they will join.
   2. Exposed fire-resistive joint systems: Products shall have flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84-15.
   3. Joints in smoke barriers: Determine fire-resistive joint system ratings in accord with UL 2079.
      a. L-rating shall not exceed 5.0 cfm/ft of joint at 0.30 inch wg at both ambient and elevated temperatures.

C. Firestop systems using cementitious fill materials shall not be permitted.

D. Where there is no specific third party tested and classified firestop system available for a particular firestop configurations, obtain from firestop manufacturer, an Engineering Judgement (EJ) or Equivalent Fire Resistance Rated Assembly (EFFRA).

E. Systems shall be free of asbestos and volatile organic compounds (VOCs).

F. Systems shall be free of volatile solvents, noxious fumes and strong odors.

1.3 SUBMITTALS:

A. Shop drawings: Submit detailed drawings of each type and size penetration through fire-rated construction, indicating materials, dimensions, assembly construction and rating. Indicate through-penetration firestop system design listings, including illustrations from a qualified testing and inspection agency for each type penetration.

B. Product data: Submit product data and installation instructions for each type of installation. Include installation details and test reports indicating that firestopping materials, systems and devices meet specified requirements and design criteria. Indicate Classification marking of qualified testing and inspection agency.

C. Certifications:
   1. Submit written certification that firestop materials are asbestos free and that materials comply with local regulations.
   2. Submit written certification that firestop materials comply with local regulations controlling use of volatile organic compounds (VOC's) and are non-toxic to building occupants.

1.4 QUALITY ASSURANCE:

A. Applicable standards; standards of the following, as referenced herein:
   1. ASTM International (ASTM).
   2. Factory Mutual Research (FMR).
   3. National Fire Protection Association (NFPA).
   4. Underwriters Laboratories, Inc. (UL).

B. Fire-test-response characteristics: Provide firestopping system design listing by a testing and inspection agency in accord with the specified UL standards.

C. Acceptable installer shall comply with one or more of the following:
1. 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 UL's "Qualified Firestop Contractor Program Requirements."
2. Licensed by state or local authority, where applicable.
3. Successfully completed not less than 5 comparable scale projects.

D. Single source responsibility: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.
1. Materials from different manufacturer than allowed by tested and listed system shall not be intermixed in the same firestop system or opening.
2. Install tested and listed firestop systems before installing an Engineering Judgement or Equivalent Fire Resistance Rated Assembly (EFFRA).

E. Pre-installation meeting: Prior to beginning firestopping work, a pre-installation meeting shall be held to review work to be accomplished.
1. Contractor, Architect, firestopping system manufacturers' representatives, installer and other subcontractors whose work involves firestopping shall be present.
2. Contractor shall notify all parties at least seven days prior to time for meeting.
3. Contractor shall record minutes of meeting and distribute to attending parties.

F. Mock-ups:
1. Install one of each type firestopping assembly for review by Architect prior to commencement of firestopping work. Notify Architect at least 36 hours in advance for observation of mock-up installations, including check for objectionable or noxious fumes or odors. Should mock-ups be unacceptable, prepare additional mock-ups until acceptable to Architect.
2. Following Architect's review, identify and preserve mock-ups as a standard of quality for remaining firestopping work. Acceptable mock-ups may remain as part of the finished work.

1.5 DELIVERY STORAGE AND HANDLING:

A. Deliver firestopping materials in original, unopened containers or packages with intact and legible manufacturers’ labels identifying product and manufacturer.

B. Store and handle firestopping materials in accord with manufacturer’s product data.

1.6 JOB CONDITIONS:

A. Coordinate firestopping installation with other work requiring penetrations through fire-resistive construction. Install penetrating elements prior to installation of firestopping systems or devices.

B. Secure inspection and approval of firestopping work by building officials prior to concealment.

C. Support penetrating elements independently of firestopping systems or devices.

D. Do not cover up firestopping installations until Owner's inspection agency or Authorities Having Jurisdiction have examined each installation.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL:

A. Penetration firestopping systems, devices and sealants shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Sealant shall have a VOC content of 250 g/L or less.

2.2 THROUGH-PENETRATION FIRESTOP SYSTEMS:

A. Acceptable manufacturers; subject to compliance with specified requirements:
1. Hilti USA.
2. 3M Fire Protection Products.
3. Nelson Firestop Products.
4. The RectorSeal Corp.
5. Specified Technologies, Inc. (STI).
6. Tremco, Inc.

B. System description: Field-constructed firestopping for penetrations through walls and floors composed of specified materials and accessories assembled in accord with Through-Penetration Firestopping System Numbers, listed in UL Building Materials Directory, current Edition, and tested in accord with ASTM E814-13a.

C. Materials: UL Classified for use in through-penetration firestop systems.
1. Firestop sealant: Single-component, elastomeric silicone or endothermic latex sealant compound; self-adhering, flexible and watertight; non-sag and self-leveling types as required.
2. Firestop foam: Two-part, room temperature vulcanizing, silicone elastomer, non-combustible foam void seal.
3. Intumescent sealants and putties: Single-component, synthetic, organic/inorganic intumescent elastomers.
4. Intumescent wrap strips: One-part, organic/inorganic, intumescent elastomeric sheet; aluminum foil-faced one side.
5. Intumescent composite sheets: Composite sheets composed of organic/inorganic intumescent elastomeric core bonded on one side to 28 ga. galvanized steel sheet and other side reinforced with steel wire mesh, covered with aluminum foil.
6. Mineral wool or ceramic fiber safing: Non-combustible fiber tested in accord with ASTM E136-12, with melting point in excess of 2000 degrees F.; flame spread of 15 maximum and 0 smoke development when tested in accord with ASTM E84-15. Thickness and density shall be as required by Through-Penetration Firestop System designs.

D. Accessories:
1. Primers, adhesives and backer rods: As required by manufacturer's product data and system designs.
2. Forming, damming and packing materials: Types as indicated in Through-Penetration Firestop Systems.
3. Restricting collars: Manufacturer's standard design as required for firestop system.

4. Fasteners, anchor clips, sleeves, clamps, spacers, ties, cover plates and miscellaneous accessories: Provide as required by manufacturer's product data and in accord with Through-Penetration Firestop System designs.

2.3 THROUGH-PENETRATION FIRESTOP DEVICES:

A. Acceptable manufacturers; subject to compliance with specified requirements:
1. Hilti USA.
2. Isolatek International, Inc.
3. Nelson Firestop Products.
4. ProSet Systems, Inc.
5. The RectorSeal Corp.
6. Specified Technologies, Inc. (STI).
7. Tremco, Inc.

B. Types: Factory-assembled, self-contained firestopping devices for penetrations through walls and floors; UL Classified for Through-Penetration Firestop Devices as listed in UL Building Materials Directory, current Edition, and tested in accord with ASTM E814-13a.

C. Accessories: Provide sealants, adhesives, fasteners, sleeves, clamps, spacers, anchor clips, ties and accessories in accord with manufacturer's product data and as required for complete installation.

2.4 FIRESTOP SEALANTS:

A. Acceptable products; subject to compliance with specified requirements:
1. Hilti USA, CP 601S Firestop Sealant.
2. Nelson Firestop Products, CLK.
3. 3M Fire Protection Products, Fire Barrier Silicone Sealant 2000 N/S.
4. The RectorSeal Corp., FlameSafe FS 4000 Silicone Sealant.
5. The RectorSeal Corp., Metacaulk 835+.
6. Specified Technologies, Inc. (STI), SpecSeal Pen 300 Silicone Joint Sealant.
7. Tremco, Inc., Fyre-Sil.

B. Characteristics: Single-component, self-adhering, flexible, watertight, elastomeric silicone sealant compound; UL Classified. Provide self-leveling type for horizontal applications, non-sag type for all other applications.

2.5 SAFING:

A. Acceptable products; subject to compliance with specified requirements:
1. Thermal Ceramics, Cerablanket F.S.
2. Thermafiber Inc., Thermafiber Safing Insulation.

B. Characteristics:
1. Material: Semi-rigid mineral fiber insulation, meeting ASTM C665-15, Type 1.
2. Density: 4.0 pcf.
3. Thickness: As required to meet specified requirements.
4. Facing: Unfaced or reinforced foil facing, based on UL Design selected.
5. Fire resistance properties:
a. Melting point: Minimum of 2000°F. when tested in accord with ASTM C24-09(2013).
b. Non-combustible: As defined by ASTM E136-12 and NFPA.

c. Fire hazard characteristics: Maximum flame spread of 15 and smoke development of 5 when tested in accord with ASTM E84-15 (unfaced).

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine areas to receive firestopping materials prior to beginning work. Verify that opening areas and dimensions for penetrations to receive firestopping systems and devices do not exceed design requirements.

B. Remove projections interfering with installation. Prepare surfaces in accord with manufacturer's product data and UL Through-Penetration Firestop Devices Numbers.

3.2 PREPARATION:

A. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer’s recommended products and methods. Confine primers to areas of bond. Do not allow spillage and migration onto exposed surfaces.

B. Masking tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of the Work. Remove tape as soon as it is possible to do so without disturbing the firestopping seal with substrates.

3.3 INSTALLATION:

A. General:
1. Comply with manufacturer's product data and UL Classified for Through-Penetration Firestop Devices Numbers.
2. Install firestopping materials fitted to adjacent construction to fill voids.
3. Firestop penetrations through fire-rated walls, partitions, floors and floor/ceiling assemblies with tested assemblies in accord with UL 1479 or with a through-penetration firestop system or device when tested in accord with ASTM E814-13a.
4. Firestopping shall comply with code requirements.

B. Fire and smoke barrier identification:
1. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other rated wall required to have protected openings shall be effectively and permanently identified with signs or stenciling in a manner acceptable to the Authority having Jurisdiction.
2. Such identification shall be:
   a. Located in accessible concealed floor, floor-ceiling or attic spaces.
   b. Located within 15'-0" of the end of each wall and at intervals not exceeding 30'-0" measured horizontally long the wall or partition.
   c. Include lettering not less than 3" in height with a minimum 3/8" stroke in a contrasting color
3. Suggested wording for fire and smoke barriers: “_____ HOUR FIRE AND SMOKE BARRIER – PROTECT ALL OPENINGS.”

C. Through-penetration firestop systems and devices:
   1. Install at penetrations through fire-rated floor and wall construction, including partitions and floor/ceiling assemblies, in accord with manufacturer's product data and UL System Numbers. Provide materials and accessories as required.
   2. Install intumescent type firestop systems where plastic piping, cable, conduit and other combustible items, including insulated metal pipes, penetrate fire-rated construction.
   3. At Contractor's option, through-penetration firestop devices of similar function may be installed in lieu of firestop systems.
   4. Do not remove forming materials unless specified in system designs.

D. Firestop sealant: Seal perimeters, voids and joints of fire-rated walls and partitions, including abutment of floor and roof or ceiling structure, and flutes of metal decking.
   1. If required by UL Design, install mineral wool or ceramic fiber in cavities, packed full and tight with allowance for sealant installation.
   2. Seal both faces of walls and partitions with firestop sealant. Tool sealant flush with adjacent finish.
   3. In accord with UL Fire Resistance Directory Designs, packed concrete and masonry joints shall be sealed using firestop sealant or using sealant as specified in Joint Sealants section.

E. Mineral fiber safing:
   1. Install safing in cavities of penetrations through non-rated floor and wall construction, including spaces around piping, conduits, cables and duct penetrations.
   2. Install safing in voids and joints of non-rated walls and partitions abutting metal decking of floor and roof structures. Pack flutes of metal decking solid with safing material.
   3. Safing shall be installed at joints and penetrations in non-rated construction not exposed to view and concealed in finish work. Secure safing by compressing into voids or joints and using manufacturer's standard clips or closure plates as required.

F. Seal voids and joints of non-rated walls and partitions abutting concrete floor and roof construction using sealant as specified in other sections.

3.4 FIELD QUALITY CONTROL:

A. Inspection: Independent inspection agency employed and paid by Owner, will examine penetration firestopping in accord with ASTM E2174-14b and ASTM E2393-10a. Inspection agency will examine firestopping and will determine, in general, that firestopping has been installed in compliance with tested and listed firestop system, and that installation process conforms to UL Qualified Firestop Contractor Program.

B. Inspector will advise contractor of deficiencies noted within one working day.

C. Do not proceed to enclose firestopping with other construction until inspection agency has verified firestop installation complies with requirements of Contract Documents.

D. Where deficiencies are found, repair or replace firestopping so that it complies with requirements of tested and listed system design.

3.5 CLEANING:

A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses. Use methods and cleaning materials approved by manufacturers of firestopping products and or assemblies in which openings and joints occur.

B. Protect firestopping during and after curing period from contact with contaminating substances.

End of Section

SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work specified elsewhere:
1. Window framing internal sealants.
2. Glazing sealants.
3. Roofing and flashing sealants.
4. Firestopping.

B. Definitions:
1. Joint sealant:
a. A weatherproof elastomer used in filling and sealing joints, having properties of adhesion, cohesion, extensibility under tension, compressibility and recovery; designed to make joints air and watertight.
b. Material is designed generally for application in exterior joints and for joints subject to movement.
2. Joint sealant compound:
a. A material used in filling joints and seams, having properties of adhesion and cohesion; not required to have extensibility and recovery properties.
b. Material is designed generally for application in interior joints not subject to movement.
3. Caulk: The process of filling joints, without regard to type of material.
4. Joint failure: A caulked joint exhibiting one or more of the following characteristics:
a. Air and/or water leakage.
b. Migration and/or reversion.
c. Loss of adhesion.
d. Loss of cohesion.
e. Failure to cure.
f. Discoloration.
g. Staining of adjacent work.
h. Development of bubbles, air pockets or voids.

1.2 SUBMITTALS:

A. Product data: Submit manufacturer's product description, indicating conformance with specified requirements and installation instructions for each type of sealant. Indicate preparation and priming requirements for each substrate condition.

B. Color samples:
1. Samples for initial selection: Samples shall be actual materials or literature depicting actual colors of standard color materials showing full range of colors available for each product exposed to view.
2. Samples for verification: For each kind and color of joint sealant required, provide samples with joint sealants in 1/2" wide joints formed between two 6" long strips of material matching appearance of exposed surfaces adjacent to joint sealants.

C. Adhesion compatibility test results: Submit a letter from sealant manufacturer indicating adhesion and compatibility testing has been performed and that materials are compatible and that adhesion is acceptable. Indicate requirements for primers or special preparation.

D. Joint sealant schedule: Include the following information:
1. Joint sealant applications, joint locations, and designations.
2. Joint sealant manufacturers and product names.
3. Joint sealant formulations.
4. Joint sealant colors.

1.3 QUALITY ASSURANCE:

A. Applicable standards as referenced herein:
1. ASTM International (ASTM).

B. Adhesion compatibility tests: Perform tests on actual samples of aluminum framing system components, to determine that materials are compatible and that adhesion is acceptable. Identify requirements for primers or special preparation.
1. Test structural sealants in accord with ASTM C1135-00(2011).

C. VOC content of interior sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Architectural sealants: 250 g/L.
2. Sealant primers for nonporous substrates: 250 g/L.
3. Sealant primers for porous substrates: 775 g/L.

D. Architect reserves the right to reject work not in conformance with selected colors, based upon verification samples.

E. Mock-up:
1. Prepare, caulk and finish one mock-up sample of each joint condition.
2. Sample joints shall be approved by Architect prior to beginning work. Approved, undamaged mock-up joints shall serve as a standard of quality for the remainder of the work.

1.4 PROJECT/SITE CONDITIONS:

A. Weather conditions:
1. Install no materials under adverse weather conditions or when temperatures are below or above those recommended by manufacturer's product data or when substrate moisture content is above manufacturer's recommended level.
2. Proceed with work only when forecasted weather conditions are favorable for joint cure and development of high early bond strength.
3. Wherever joint width is affected by ambient temperature variations, install materials only when temperatures are in lower third of manufacturer's recommended installation temperature range.

B. Protection of adjacent surfaces:
1. Protect by applying masking material or manipulating application equipment to keep materials in joint. If masking materials are used, allow no tape to touch cleaned surfaces to receive sealant. Remove tape immediately after sealant application, before surface skin begins to form.
2. Remove misapplied materials from surfaces by using solvents and methods recommended by manufacturer.

3. At surfaces from which materials have been removed, restore to original condition and appearance.

1.5 WARRANTIES:

A. Installer's warranty: Warrant work to be watertight and free from defects in materials and workmanship, including joint failure, for a period of five years.

B. Exterior silicone sealant material warranty: Warrant exterior silicone sealants to be free from defects in materials and to provide structural adhesion, watertight weatherseal and non-staining of adjacent materials for a period of twenty years.

C. Warranties shall begin at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 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 nonporous substrates shall have a VOC content of 775 g/L or less.

2.2 SILICONE SEALANTS:

A. Low modulus silicone sealant:
1. Acceptable products; subject to compliance with specified requirements:
a. Dow Corning Corp., #790.
b. Momentive Performance Materials, Inc., GE Silpruf LM SCS2700.
c. Pecora Corp., #890NST.
d. Tremco, Inc., an RPM Company, SpecTrem 1.
2. Type: One-part, low modulus silicone rubber; meeting ASTM C920-14a, Type S, Grade NS, Class 50, for use NT.
3. Colors: As selected by Architect from manufacturer’s full range.

B. Medium modulus silicone sealant:
1. Acceptable products; subject to compliance with specified requirements:
a. Dow Corning Corp., #795.
b. Momentive Performance Materials, Inc., GE Silpruf SCS2000.
c. Pecora Corp., #895NST.
d. Tremco, Inc., an RPM Company, SpecTrem 2.
2. Type: One-part silicone rubber; meeting ASTM C920-14a, Type S, Grade NS, Class 50, for use NT.
3. Colors: As selected by Architect from manufacturer’s full range.

2.3 TWO-PART POLYURETHANE SEALANT FOR HORIZONTAL TRAFFIC-BEARING PAVEMENTS:
A. Acceptable products:
1. BASF Building Systems, MasterSeal SL 2.
2. Pecora Corp., Urexpan NR-200.

3. Tremco, Inc., an RPM Company, 45 SSL.

B. Characteristics:
1. Type: Two-component polyurethane sealant for horizontal traffic-bearing surfaces meeting ASTM C920-14a, Type M, Grade P or NS, minimum Class 25, for use T; self-leveling for flat surfaces and non-sag for sloped surfaces.
2. Colors: As selected by Architect from manufacturer's full range.

2.4 SILICONE BATH SEALANT FOR WET AREAS:

A. Acceptable products:
1. Dow Corning Corp., 786 Mildew-Resistant Silicone Sealant.
2. Franklin International, Titebond Kitchen & Bath Sealant.
3. Momentive Performance Materials, Inc., GE Sanitary SCS1700.
4. Pecora Corp., #898NST Silicone Sanitary Sealant.

B. Characteristics:
1. Type: One-part silicone rubber, mildew- and stain-resistant, acid-curing silicone sealant; meeting ASTM C920-14a, Type S, Grade NS, Class 25, for use NT.
2. Colors: As selected by Architect from manufacturer's full range.

2.5 SOLVENT-RELEASE-CURING ACRYLIC SEALANT:

A. Acceptable products:
1. Franklin International, Titebond Painters Plus Caulk.
2. Schnee-Morehead, Inc., Acryl-R Acrylic Sealant.
3. Tremco, Inc., an RPM Company, Mono 555.

B. Characteristics:
1. Type: One-part, acrylic polymer sealant, meeting ASTM C1311-14.
2. Colors: As selected by Architect from manufacturer's full range.

2.6 PAINTABLE ACRYLIC-LATEX JOINT SEALANT:

A. Acceptable products:
1. Bostik, Chem-Calk 600.
2. Franklin International, Titebond Painters Caulk.
3. Momentive Performance Materials, Inc., GE RCS20.
4. Pecora Corp., AC-20 Acrylic Latex.
5. Tremco, Inc., an RPM Company, Tremflex 834.

B. Characteristics: Flexible, paintable, non-staining, non-bleeding acrylic latex or siliconized acrylic emulsion, meeting ASTM C834-14, Type OP, Grade NF.

2.7 ACCESSORY MATERIALS:

A. Joint cleaner: Type recommended by material manufacturer for substrates indicated.

B. Joint primer/sealer: Type recommended by material manufacturer for substrates, conditions and exposures indicated.

C. Bond breaker tape: Plastic tape applied to contact surfaces where bond to substrate or joint filler must be avoided for material performance.

D. Sealant backer rod: Compressible rod stock as recommended by sealant manufacturer for compatibility with sealant. Provide size and shape of rod to control joint depth.

E. Tooling agent: Agent recommended by material manufacturer to ensure contact of material with inner joint faces.

PART 3 - EXECUTION

3.1 JOINT SURFACE PREPARATION:

A. Clean joints of debris and projections including shims.

B. Clean joint surfaces immediately before caulking joints. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond.

C. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless material manufacturer's product data indicates that alkalinity does not interfere with bond and performance. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution; rinse with clean water and allow to dry before caulking.

D. Roughen joint surfaces of non-porous materials, unless material manufacturer's product data indicates equal bond strength as porous surfaces. Rub with fine abrasive cloth or wool to produce dull sheen.

3.2 APPLICATION:

A. Comply with joint sealant material manufacturer's product data and ASTM C1193-13 except where more stringent requirements are specified.

B. Prime joint surfaces where recommended by material manufacturer. Do not allow primer/sealer to spill or migrate onto adjacent surfaces.

C. Install backer rod for joint sealant materials, except where recommended by material manufacturer to be omitted for application indicated.
1. Place backer rod to maintain recommended sealant thickness and profile.
2. Place rod at depth to provide sealant manufacturer’s recommended sealant depth.
3. Do not twist rod during installation.
4. Place rod to minimize possibility of extrusion when joint is compressed.
5. Install bond breaker tape in lieu of backer rod for shallow, closed joints and as recommended by manufacturer’s product data.

D. Employ installation techniques which will ensure that materials are deposited in uniform, continuous ribbons without gaps or air pockets, with complete wetting of joint bond surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form slight cove so that joint will not trap moisture and debris.

E. Do not allow materials to overflow onto adjacent surfaces. Prevent staining of adjacent surfaces.

F. Remove excess and misplaced materials as work progresses. Clean the adjoining surfaces to remove misplaced materials, without damage to adjacent surfaces or finishes.

G. Interior joints: At interior joints and seams at abutting and adjacent materials, recess joint sealant 3/16" in joints wider than 1/4". At joints 1/4" or less in width, tool joint sealant flush.

H. Tool joints of non-sag sealant to concave profile and smooth, uniform surface, flush with edges of substrate. Maintain sealant depth-to-width ratio in accord with manufacturer's product data.

I. Cure joint sealants and joint sealant compounds in accord with manufacturer's product data to obtain high early bond strength, internal cohesive strength and surface durability. Protect uncured surfaces from contamination and physical damage.

3.3 JOINT SEALANT SCHEDULE:

A. Exterior vertical expansion joints: Low modulus silicone sealant.

B. Exterior and interior joints in masonry, including control joints: Low modulus silicone sealant.

C. Joints between metal panels: Medium modulus silicone sealant.

D. Exterior and interior joints at perimeter of aluminum framing systems: Medium modulus silicone sealant.

E. Exterior and interior joints at perimeter of hollow metal framing: Medium modulus silicone sealant.

F. Exterior joints between wall finish and conduit and pipe penetrations, base plates of light fixtures, signage supports, and other items applied to exterior wall surface: Medium modulus silicone sealant.

G. Interior concealed bedding joints and thresholds: Acrylic sealant. Solvent-release-curing acrylic sealant.

H. Tile expansion and control joint sealant: Refer to Tiling section.

I. Firestopped joints: Firestop sealant as specified in Firestopping section.

J. Typical interior joints and seams at abutting and adjacent materials except as specified herein: Paintable acrylic-latex joint sealant.

K. Interior joints in conjunction with vanities, fixtures and tile finishes: Silicone bath sealant.

End of Section

SECTION 08 1113

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work specified elsewhere:
1. Wood doors.
2. Door hardware.
3. Glazing.
4. Painting and coating.

1.2 PERFORMANCE REQUIREMENTS:

A. The following performance requirements apply to all doors specified herein.

B. Physical endurance: Comply with performance level for specified level classification in accord with ANSI/SDI A250.8-2014 and ANSI/SDI A250.4-2011 for doors and hardware reinforcing, ANSI/SDI A250.4-2011 for doors, frames, frame anchors and hardware reinforcings.

C. Finish: Comply with standard performance criteria of ANSI/SDI A250.10-2011 for primed steel surfaces.

D. 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 indicated, and temperature-rise limits where required, 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.
2. 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.

E. Thermal performance of exterior insulated doors: Minimum aged value of U = 0.40 (R = 2.5) or better, apparent thermal performance in accord with SDI-113-13.

1.3 SUBMITTALS:

A. Shop drawings: Indicate door and frame elevations and sections, materials, gauges and finishes, fabrication and erection details, location of finish hardware by dimension and locations, details of openings and louvers, and fire-resistance ratings, and temperature-rise ratings, requirements.

B. Samples: Submit as follows:
1. Door: 1'-0" by 1'-0" corner section showing door construction.
2. Welded frame: 1'-0" by 1'-0" head and jamb corner section showing welded corner construction.
3. Anchors: One of each type.

C. Product data:
1. Indicate that hollow metal doors and frames comply with specified requirements, including performance criteria.
2. Sustainable design submittals: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

D. Certification of label construction: For components exceeding Underwriters Laboratories Inc. (UL) tested size limitations, submit UL inspection certificate stating that component construction conforms to UL rating requirements.

1.4 QUALITY ASSURANCE:

A. Applicable standards; standards of the following, as referenced herein:
1. American National Standards Institute, Inc. (ANSI).
2. ASTM International (ASTM).
3. National Fire Protection Association (NFPA), National Fire Codes.
4. Society for Protective Coatings (SSPC).
5. Steel Door Institute (SDI).
6. Underwriters Laboratories, Inc. (UL).

B. Fabrication standard: Except for more stringent requirements specified, comply with ANSI/SDI A250.8-2014 including performance levels as referenced.

C. Fire door assemblies:
1. Door and frame assemblies in rated walls shall have been tested in accord with NFPA 252 or UL 10C; after 5 minutes into NFPA 252 test, neutral pressure shall have been established at 40" or less above sill.
2. Door and frame assemblies in corridors and smoke barriers shall have a minimum fire rating of 20 minutes and shall have been tested in accord with NFPA 252 or UL 10C without hose stream test. Assemblies shall comply with UL 1784 for draft and smoke control test; leakage may not exceed 3.0 CFM per foot of door at 0.10" of water column.

D. Labeling requirements:
1. Fire-rated components shall bear factory-applied labels showing name of manufacturer, name of third-party inspection agency, fire-protection rating, and where required for doors in exit enclosures, maximum transmitted temperature end point.
2. Smoke and draft doors complying with UL 1784 shall be labeled as a smoke and draft control door.
3. Permanently attach label to hinge stile of each fire-rated and smoke and draft control door.

E. Source limitations: Obtain hollow-metal work from single source from single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Mark each hollow metal door and frame at top hinge and on outside of packaging with destination door mark indicated on door schedule.

B. Deliver hollow metal doors and frames palletized, packaged or crated for protection during transit and site storage.
1. Do not use nonvented plastic.
2. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
3. Provide additional protection to prevent damage to factory-finished units.

C. Inspect work upon delivery for damage. Reject damaged items.

D. Store materials under cover, on raised platforms.
1. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4" high wood blocking. Provide minimum 1/4" space between each stacked door to permit air circulation.
2. Protect from moisture but provide for cross ventilation. Remove units from wet packaging if wetting occurs.

PART 2 - PRODUCTS

2.1 MATERIAL:

A. Steel:
1. Interior doors and frames: Fabricate of cold-rolled steel sheet meeting ASTM A1008-13.
2. Exterior doors and frames: Fabricate of commercial quality, hot dip galvanized or galvannealed steel sheet meeting ASTM A924-14 and ASTM A653-13 Designation A60 or G60; wipe coat not acceptable.

B. Finish: Prime painted steel surfaces shall comply with requirements for acceptance stated in ANSI/SDI A250.3-2007(R2011).
1. Interior doors and frames: One coat of manufacturer's standard rust-inhibitive primer.
2. Exterior doors and frames: One coat of manufacturer's standard rust-inhibitive primer after chemical treatment of galvanized surfaces for paint adhesion.

C. Coating for inside of frames to be fully grouted in masonry and concrete construction: Factory or field applied epoxy undercoating:
1. Tnemec Series 66 Hi-Build Epoxoline.
2. Devoe High Performance Coatings, Devran 224HS High Build Epoxy.
3. PPG Aquapon High-Build Semi-Gloss Polyamide-Epoxy Coating 97-130 Series.

2.2 DOORS:

A. Physical performance: Performance for each level shall be in accord with ANSI/SDI A250.4-2011.

B. Door classification:
1. Standard interior hollow metal doors (1-3/4" thickness): Level 2, Heavy-duty, 18 ga., Model 2 - Seamless.
2. Label fire-resistive composite metal doors (1-3/4" thickness):
a. Level 2, Heavy-duty, 18 ga., Model 2 - Seamless.
b. For fire doors in exit enclosures, average temperature developed on unexposed side during fire-resistance testing shall not exceed 450°F. at end of 30 minutes in fire test.
3. Exterior composite metal doors (1-3/4" thickness): Level 2, Heavy-duty, 18 ga. Model Model 2 - Seamless.

C. Door construction:
1. Core:
a. Exterior doors: Polyurethane.
b. Interior doors: Steel-stiffened door cores. Provide minimum thickness 0.026", steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6" apart. Spot weld to face sheets no more than 5" o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
c. Fire door cores: Mineral board or as required to provide fire-protection and temperature-rise ratings indicated.
2. Edge bevel: Vertical edges beveled 1/8" in 2"; double-acting doors rounded on 2-1/8" radius. Non-handed door blanks with filler plates are not acceptable.
3. Top and bottom edges: Flush, welded, minimum 18 ga. steel. Provide weep holes in bottom edge of exterior doors.
4. Door faces and edge seams:
a. Full flush: Form each door face from a single sheet of steel of thickness specified herein. There shall be no visible seams on surface of faces. A full height vertical seam is permitted on door edges.
b. Seamless: In addition to requirements of Full Flush doors, no visible seams shall be permitted along vertical edges. Use one of the following seam edge methods:
1) Fill vertical seam edges and dress smooth.
2) Intermediately weld seams, fill edges, and dress smooth.
3) Continuously weld seams and dress smooth.

D. Glass moldings and stops:
1. Where specified or scheduled, provide doors with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on approved shop drawings.
2. Weld fixed moldings to door on security side.
3. Loose stops shall be not less than 20 gage, with mitered corner joints, secured to frame opening by cadmium- or zinc-coated countersunk screws at 1'-0" o.c. maximum.
4. Design snap-in moldings with mitered corners and with a non-removable stop on security side after glass installation.

2.3 FRAMES:

A. Frame construction including sidelights and borrowed lite frames:
1. Welded steel frames in masonry walls, fire-rated frames and frames over 7'-0" in height in drywall partitions:
a. Gage:
1) Level 2: 18 gage.
2) Level 3: 16 gage.

b. Full profile welded, with all joints, including face, returns, soffit, stops, and rabbets, arc welded, dressed and ground smooth; no mechanical interlocking allowed.
c. Provide welded frames with temporary spreaders during shipping, storage and erection. Spreaders shall span both rabbets of frame and be located at bottom and at middle of frame.

2. Transom bars and mullions: Shop fabricate from same material as door frames.
   a. Setup arc welded, with all joints, including face, flange and throat, full welded, dressed and ground smooth; no mechanical interlocking allowed.
   b. Fabricate in largest size sections allowed by shipping and installation restrictions. Field joints shall occur only as indicated on approved shop drawings.
3. Machine door frames for hardware scheduled for installation on that frame. Filler plates installed at unused openings will not be acceptable. Provide blockouts behind frame for continuous hinges.
4. Joints:
   a. Dress welded joints and ground smooth, indistinguishable in completed work.
   b. Make non-welded connections with tight fitting, closed joints.
   c. Make joints with aligned faces and arrises.
5. Inside of frames to be grouted in masonry and concrete construction shall receive protective coating as specified herein.
6. Loose glazing stops:
   a. Removable glazing stops shall be cold rolled steel, no less than 20 gage, butted at corner joints and secured to frame using cadmium or zinc plated #6 countersunk sheet metal screws at 1'-0" o.c. maximum.
   b. Frame underneath glazing stops and inside of glazing stop shall be treated for maximum paint adhesion and shall receive factory spray-applied high-build epoxy coating specified herein, 4 to 6 mils dft., prior to installation in frame.

B. Frame anchors:
1. Wall anchors for frame attachment to masonry construction: Adjustable, flat, minimum 18 gage corrugated or perforated, T-shaped steel anchors with leg not less than 2" wide by 10" long. Provide one anchor per jamb for each 2'-0" of height or fraction thereof. Anchors for fire-rated frames shall be labeled type.
2. Wall anchors for frame attachment to drywall partitions: Manufacturer's standard minimum 18 gage adjustable type for attachment to studs. Provide one anchor per jamb for each 2'-0" of height or fraction thereof. Anchors for fire-rated frames shall be labeled type.
3. Floor anchors: Provide frames, other than slip-on drywall type, with minimum 18 gage anchors for attachment to floor.
   a. For wall conditions that do not allow for the use of a floor anchor, provide an additional jamb anchor.
   b. Anchors for fire-rated frames shall be labeled type.
4. In-place masonry or concrete: 3/8" countersunk, flat head, stove bolts in expansion shields, spaced 6" maximum from top and bottom of frame and at 2'-0" o. c., maximum, between. Anchors for fire-rated frames shall be labeled type.
5. Head struts: For frames over 7'-0" high and not anchored to masonry or concrete construction, provide 1/4" by 2" steel struts spot welded to jambs, each side, extending to building structure. Attach to structure. For frames over 4'-0" in width, provide center strut at head.

2.4 ACCESSORIES:

A. 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" beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

2.5 PREPARATION FOR HARDWARE AND ANCHORS:

A. Reinforcement: Factory reinforce door and frame components for hardware installation in accord with ANSI/SDI A250.8-2014 and ANSI/SDI A250.6-03(R2009).

B. Punch single leaf frames to receive three silencers; double leaf frames to receive two silencers per leaf, at head.

C. Provide grout shields where frames in masonry walls are cut or drilled.

D. Install hardware reinforcement and anchors without distortions or blemishes on exposed surfaces.

PART 3 - EXECUTION

3.1 FRAME INSTALLATION:

A. General:
1. Install hollow metal frames in accord with ANSI/SDI A250.8-2014, ANSI/SDI A250.11-2012, SDI-122-07, manufacturer's product data and approved shop drawings.
2. Frames in masonry and concrete walls and fire-rated frames shall be tightly butted to walls. For other frames, clearance between frame and interfacing wall surfaces shall be 1/16" maximum.
3. Shimming of door hinges is not an acceptable correction of door frames installed out of erection tolerance.

B. Welded frames:
1. Set welded frames in position prior to beginning partition work. Brace frames until permanent anchors are set.
2. Set anchors for frames as work progresses. Install anchors at hinge and strike levels. Install rubber bumpers and silencers in frames prior to grouting.
3. Grout frames in masonry walls as specified in Concrete Unit Masonry section.
4. Remove temporary spreaders before frame installation is complete.
5. Remove temporary braces after wall construction is complete.
6. Install welded frames in prepared openings in concrete and masonry walls using countersunk bolts and expansion shields.
7. Weld field splices in borrowed lite frames and grind smooth.

C. Knockdown frames: Install in accord with approved shop drawings. Secure using adjustable jamb and base anchors. Complete installation shall have tight-fitting joints, without gaps or offsets.

D. Fire-rated frames: Install in accord with requirements of NFPA No. 80 and ANSI/SDI A250.11-2012.

3.2 DOOR INSTALLATION:

A. General:
1. Install doors in accord with SDI-122-07, ANSI/SDI A250.8-2014, manufacturer's product data and approved shop drawings.
2. Install hollow metal doors in frames, using hardware specified in Door Hardware section.

3. Shimming of door hinges is not an acceptable repair of warped doors or door frames out of erection tolerances.
4. Seal tops of exterior, out-swinging doors prior to painting. Paint bottoms of doors in accord with Painting and Coating section prior to hanging doors.

B. Edge clearances at doors:
1. Between door and frame, at head and jambs: 1/8".
2. At meeting edges of pairs of doors and at mullions: 1/8" to 1/4" (1/8" for fire rated doors).
3. At sills without thresholds: 3/8" maximum above finish floor.
4. At sills with thresholds: 3/8" maximum above top of threshold.
5. Between face of door and door stop: 1/16".

C. Fire-rated doors: Install in accord with requirements of NFPA No. 80, SDI-118-12 and ANSI/SDI A250.11-2012.

D. Smoke and draft control doors: Install in accord with NFPA 105.

3.3 SITE TOLERANCES:

A. Allowable erection tolerances:
1. Variation from specified clearances: +1/32".
2. Variation in face alignment, pairs of doors: +1/16".
3. Variation in face alignment between door and frame: 1/8" maximum.

3.4 CLEANING AND PROTECTION:

A. Protect hollow metal doors and frames from damage and staining until Date of Substantial Completion. Replace or repair damaged or stained components.

B. Replace components which exhibit warp, buckle or broken welds.

End of Section

SECTION 08 1400

WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work specified elsewhere:
1. Metal door frames.
2 Door hardware.
3. Glazing.

1.2 SUBMITTALS:

A. Product data: Submit manufacturer's product description, indicating materials, classifications, factory finish and fabrication. Include manufacturer's proposed warranty. Indicate that doors meet specified requirements, including fire ratings. Include manufacturer's requirements for door installation, care, maintenance and cleaning to obtain specified warranties.

B. Shop drawings: Submit schedules and elevations indicating door sizes, construction, swing, fire rating, undercut, and hardware locations. Dimension and detail openings for glass lites. Indicate that doors meet specified requirements, including fire ratings.

C. Samples:
1. Submit 4" by 4" door corner samples indicating construction for each door type.
2. Submit a minimum of 3 samples of each face veneer, 2'-0" by 2'-0" in size, representative of proposed species, cut, color and grain, with proposed factory finish. Accepted samples shall indicate extremes of color, graining, defects and general quality of proposed veneers.

D. Intent to warrant and certifications: Submit an Intent to Warrant executed by authorized representative of door manufacturer, indicating that manufacturer has reviewed drawings and specifications, conditions affecting the work and the relationship of doors with related work, and that manufacturer proposes to provide warranties as referenced herein without further stipulation.

1.3 QUALITY ASSURANCE:

A. Allowable color and grain variation of natural finished doors: Color and grain shall be uniform and within range established by accepted veneer samples as specified herein. Joints in face veneers shall be inconspicuous. Adjacent doors and doors viewed together shall have similar color and grain.

B. Fire door assemblies:
1. Door assemblies in rated walls shall have been tested in accord with NFPA 252 or UL 10C.
2. Door assemblies in corridors and smoke barriers shall have a minimum fire rating of 20 minutes and shall have been tested in accord with NFPA 252 or UL 10C without hose stream test. Assemblies shall comply with UL 1784 for draft and smoke control test; leakage may not exceed 3.0 CFM per foot of door at 0.10" of water column.
3. Fire-rated doors shall provide rating without use of salt-treated wood, or manufacturer shall provide certification that treated wood is non-hygroscopic and shall warrant door against failure or discoloration of face veneer and door finish.

4. For fire doors in exit enclosures the average temperature developed on unexposed side during fire-resistance testing shall not exceed 450°F. at the end of 30 minutes in fire test.

C. Labeling requirements:
1. On top edge, provide each door with a label which identifies manufacturer, trade association of which he is a member, grade and type of door or industry standard with which it complies.
2. Fire-rated components shall bear factory-applied labels showing manufacturer's name, name of third-party inspection agency, fire-protection rating, and where required for doors in exit enclosures, maximum transmitted temperature end point. Permanently attach label to hinge stile of each fire-rated door.
3. Smoke and draft doors complying with UL 1784 shall be labeled as a smoke and draft control door.

D. Flush doors shall be the product of one manufacturer.

E. Face veneers shall be domestically assembled veneer facing using no rainforest-produced crossbands or backs.

F. Applicable standards; as referenced herein:
1. American National Standards Institute (ANSI).
2. ASTM International (ASTM).
3. Architectural Woodwork Institute (AWI), "Architectural Woodwork Standards, 2nd Edition, October 1, 2014, herein referred to as AWS Standards.
4. Hardwood Plywood and Veneer Association (HPVA).
5. National Fire Protection Association (NFPA).
6. Underwriters Laboratories, Inc., (UL).
7. Warnock-Hersey (WH).
8. Window and Door Manufacturer's Association (WDMA).

G. Pre-installation meeting: Prior to beginning door installation work, a pre-installation meeting shall be held to review work to be accomplished.
1. Contractor, Architect, door manufacturer's representatives, and other subcontractors who have equipment relating to doors shall be present.
2. Contractor shall notify all parties at least seven days prior to time for meeting.
3. Contractor shall record minutes of meeting and distribute to attending parties.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Deliver no doors to building until weatherproof storage space is available. Store doors in a space having controlled temperature and humidity. Stack doors flat, off floor, supported to prevent warpage and protected from damage and direct exposure to sunlight.

B. Seal top and bottom edges of doors, if required by manufacturer's product data to maintain warranty.

C. Protection for shop-finished doors: Protect doors during shipping and storage by enclosing in polyethylene bags. Replace doors in original packaging for shipment to site following machining and finishing. Hang pre-machined and prefinished doors without removal of packaging. Identify each door with door number on packaging. Maintain packaging in place until Date of Substantial Completion.

D. Break packaging seal on site to permit ventilation.

E. Do not walk or stack other materials on top of stacked doors. Do not drag doors across each other.

1.5 WARRANTIES:

A. Provide manufacturer's door replacement warranty against warpage, twist, delamination, telegraphing of core and manufacturing defects for the following terms:
1. Interior solid core and mineral core doors: Lifetime of original installation.
2. Door finish for rated doors: Five years against discoloration or failure of factory finish of fire-rated mineral core doors with salt-treated wood components.

PART 2 - PRODUCTS

2.1 FLUSH WOOD DOORS, GENERAL:

A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards and WDMA I.S.1-A, "Architectural Wood Flush Doors" as indicated herein.

B. Adhesives: Do not use adhesives that contain urea formaldehyde.

C. Composite wood products: Products shall be made without urea formaldehyde.

2.2 FLUSH DOORS:

A. Acceptable manufacturers; subject to compliance with specified requirements:
1. Algoma Hardwoods, Inc.
2. Doormerica.
3. Eggers Industries, Inc.
4. Marshfield DoorSystems, Inc.
5. Oshkosh Door Co.
6. VT Industries, Inc.

B. General quality standard:
1. Performance grade: Heavy duty.
2. Aesthetic grades: Custom Grade.

C. Glued particleboard core wood doors:
1. Description: Meeting WDMA and AWS Standards, five-ply veneer face construction, AWS PC-5, particleboard core.
a. Thickness: 1-3/4".
b. Adhesive bond: Type II or better containing no urea formaldehyde.
c. Blocking: Top and bottom rail and lock stile blocking shall accommodate specified hardware, without through-bolting hardware.
d. Top rail for doors indicated to receive closers: Provide 12" high top rail for doors scheduled to receive closers. Top rail shall accommodate specified hardware without through-bolting hardware.
2. Particleboard core: Single-piece particleboard meeting ANSI A208.1, Grade LD-2, DPC-1, made with binder containing no urea-formaldehyde resin.
3. Construction: Solid hardwood, engineered laminated hardwood or structural composite lumber stiles and rails glued to core; core assembly sanded for uniform thickness.
4. Crossbanding: Engineered high density fiberboard (HDF), minimum 1/16" thickness.

5. Fire resistance rating: Comply with specified requirements for tested, labeled door construction for ratings indicated on drawings.

D. Fire-rated mineral core doors:
1. Description: Five-ply non-combustible mineral composition core construction, meeting AWS Standards, Section 9, FD Series and label requirements scheduled on drawings.
   a. Thickness: 1-3/4".
   b. Adhesive bond: Type I, containing no urea formaldehyde.
2. Core: Single piece, non-combustible, asbestos-free, mineral composite with minimum 24 pcf density when tested in accord with ASTM C303-10, with 10 percent maximum moisture absorption by weight with core in equilibrium at 90 percent relative humidity and 70° F.
3. Construction: Stiles, rails and blocking glued to core; core assembly sanded for uniform thickness. Stiles, rails and blocking shall be non-combustible composition, to receive full mortise hinge installation, with the following minimum characteristics:
   a. Screw withdrawal resistance: 600 lbs. minimum when tested in accord with ASTM D1037-12.
   b. Split resistance: 750 lbs. average when tested in accord with ASTM D143-14.
   c. Blocking: Top and bottom rail and lock stile blocking to accommodate specified hardware, meeting label requirements scheduled.
4. Crossbanding: Engineered high density fiberboard (HDF), minimum 1/16" thickness. Crossbanding shall be non-salt-treated or door finish shall be warranted by door manufacturer against failure or discoloration.
5. Fire resistance rating: Comply with specified requirements for tested, labeled door construction for ratings indicated on drawings.
6. Where rated door pairs require metal astragal for labeled construction, astragals shall be wrapped in veneer matching door face or concealed within door edge.

E. Facing veneer for transparent finish:
1. Veneer species: Select White Birch.
2. Veneer slicing: Rotary sliced panels with sequence matched veneers center matched across door width.
3. Face of door veneer matching: Book matched.
4. For pairs of doors and doors adjacent to other doors, provide running matched assembly.
5. Veneer thickness: Minimum 1/52" after sanding at 12% moisture content.
6. Adhesive bond: Type I, containing no urea formaldehyde.
7. Quality grade: A veneers.

F. Vertical stiles:
1. Stiles for transparent finish doors not requiring fire ratings: Minimum 1-3/8" wide by thickness of core with specified veneer, solid hardwood or structural composite lumber inner stile backer with edge veneer matching face veneer in specie, color and graining; no exposed fingerjoints allowed.
2. Stiles for fire-rated doors: Minimum 1-3/8" wide by thickness of core with specified veneer, solid hardwood or lamination meeting fire rating requirements; edge veneer matching face veneer.
   a. 20-minute rated pairs without metal edges or astragals: As required by manufacturer to permit positive pressure “S” label per Category H; veneer banded to match face veneer over manufacturer’s edge for improved screw holding.
   b. Mineral core doors required to meet positive pressure Category A (concealed) requirements: As required by door manufacturer.

3. Stile width for doors with cutouts:
   a. Non-rated doors: Provide minimum 5" of core between lock and light cutout or from edge of door to edge of cutout.
   b. Rated doors: Provide minimum 5-1/2" core between lock and cutout or from edge of door and edge of cutout.
   c. Opening next to lock: Provide minimum 10" lock stile.

G. Rails: Mill option hardwood or structural composite lumber and as required to meet positive pressure ratings.

H. Moldings and trim:
1. Furnish in same species as hardwood matching grain and color of face veneer for transparent finish, no fingerjoints allowed.
2. Moldings for fire-rated doors: Manufacturer's standard matching solid hardwood, laminated wood or primed steel edge meeting fire-rating requirements, Wrap steel edge with veneer matching veneer face in specie, color and graining.
3. Provide moldings for glass lites nd recessed-mounted metal grilles.

2.3 GLAZING:

A. Refer to Glazing section for tempered glazing.

2.4 FACTORY FITTING, MACHINING AND FINISHING:

A. Factory fitting and machining are required for all wood doors. Factory finishing is required for all transparent finished doors.

B. Fitting and machining:
1. Factory fit and machine doors to clearances and bevels specified.
2. Prepare for hardware installation using hardware manufacturer's templates.
   a. Locate in accord with WDMA I. S. 1.7, unless otherwise indicated.
   b. Drill pilot holes for screws and bolts.
3. Seal edges of doors and cutouts immediately following fitting and machining.

C. Openings:
1. Cut openings to receive glass lites in accord with AWS requirements or WDMA I. S. 1-A.
2. Seal edges of cutout immediately following cutting using one coat of solvent type sealer.
3. Install glass lites without looseness or rattle. Trim shall have mitered corner joints and shall conceal edges of cutout and door core.
4. Protect door faces from damage during cutting.
5. Prepare and glaze openings in fire-rated doors in accord with NFPA and UL requirements.

D. Clearances and bevel:
1. Hinge stile: 1/8".
2. Lock stile: 1/8".
3. Top: 1/8".
4. Bottom: 1/4" above floor finish or threshold, except where undercutting is indicated. Confirm installed floor covering thickness before cutting door bottom edges.
5. Meeting stiles, pairs of doors: 1/8".
6. Bevel: 1/8" in 2".

E. Sanding: Factory sand doors to comply with AWS Standards, Section 9.

F. Factory finish:
1. Type: WDMA TR-8 or AWS Standards, Section 6, Custom Grade, System AWS System 2 Conversion Varnish or Catalyzed Polyurethane, filled finish. Color and sheen shall be as selected by Architect from manufacturer's full color and sheen range.
2. Finish faces and edges of doors, including mortises and cutouts.

2.5 SOURCE QUALITY CONTROL:

A. Fabrication tolerances:
1. Overall dimension: ±1/16".
2. Width: +1/32".
3. Maximum warp, bow, cup or twist: 1/4".
4. Squareness: Maximum 1/8" difference in diagonal measurement.
5. Hardware locations: -0", +1/32".

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Acclimatization: Allow doors to become acclimated to finished space conditions a minimum of 72 hours before hanging.

B. Preparation: Verify that framed openings are installed within specified tolerances. Do not install doors in frames which are not installed within size and plumbness tolerances.

C. Installation:
1. Install doors in accord with manufacturer's product data using scheduled hardware. Install using threaded-to-the-head wood screws furnished by hardware manufacturer.
2. Anchor hardware in correct position and alignment.
3. Adjust hardware and door for proper function and for smooth, free operation, latching without force or excess clearance, within specified clearances and tolerances.

D. Fire-rated doors: Install in accord with UL requirements and NFPA No. 80-16.

E. Smoke and draft control doors: Install in accord with NFPA 105-07.

F. Erection tolerances:
1. Variation from specified clearances: +1/32", -0".
2. Maximum variation in edge alignment, pairs of doors: 1/16".

G. Replace doors with defects in material, finish, fit or machining.

End of Section

SECTION 08 3100

ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SUBMITTALS:

A. Product data: Indicate material types, finishes and sizes, fabrication and installation details and requirements.

B. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.2 QUALITY ASSURANCE:

A. Applicable standards; standards of the following, as referenced herein:
1. ASTM International (ASTM).
2. National Fire Protection Association (NFPA), National Fire Codes.

B. Labeling requirements:
1. Fire-rated access door assemblies shall bear factory-applied labels showing name of manufacturer, name of third-party inspection agency, test standard, fire-protection rating, and where required for access doors in exit enclosures, maximum transmitted temperature end point.
2. Horizontal access doors shall bear a label that includes the wording “FOR HORIZONTAL INSTALLATION”.
3. Permanently attach label to each door, panel and frame.

1.3 DELIVERY, STORAGE AND HANDLING:

A. Deliver access doors in protective packaging.

B. Store in packaging to prevent soiling and physical damage.

C. Handle to prevent damage to finished surfaces and operating mechanisms.

1.4 PROJECT/SITE CONDITIONS:

A. Protection: Protect prefinished surfaces from damage or staining. Following installation, provide protective covering for duration of project.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND PANELS:

A. Acceptable manufacturers; subject to compliance with specified requirements:
1. Activar Construction Products Group, Inc., J. L. Industries.
2. Acudor Products, Inc.
3. Babcock Davis Hatchways.
4. Karp Associates, Inc.
5. Nystrom.

B. Characteristics:
1. Size: As indicated on drawings, but not less than 1'-0" by 1'-0".

2. Types:
   a. Typical: As required by substrates.
   b. Non-fire-rated access doors in gypsum board work: Flush type with perforated frame flanges for finishing with joint compound.
3. Construction:
   a. Non-fire-rated units: Minimum 14 ga. steel sheet for doors; 16 ga. for frames; prime painted.
   b. Fire-rated units: Minimum 22 ga. steel inside and outside faces; box construction, filled with insulation; 16 ga. frames; prime painted. Horizontal panels shall have been tested in accord with ASTM E119-14 or UL 263 as horizontal assemblies.
4. Hardware:
   a. Non-fire-rated units: Manufacturer's standard concealed hinges allowing 175 degree operation and cam lock
   b. Fire-rated panels: Manufacturer's standard continuous piano hinges, self-closing mechanism, interior release and cylinder lock. Provide two keys per lock.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Coordination:
1. Coordinate installation of access doors required to be built into building structure. Secure templates or lay out to rough dimensions provided by specialty manufacturer.
2. Ensure that access door orientation and fire ratings comply with fire ratings indicated on drawings.
3. Coordinate with mechanical and plumbing sizes and locations of access doors.
4. Coordinate access door types with final finish of adjacent wall.

3.2 INSTALLATION:

A. Install access doors in accord with manufacturer's product data, plumb, level and true to line and location.

B. Install access doors with fasteners of type and spacing recommended by manufacturer's product data.

C. Set fire rated access doors at locations and elevations indicated and in accord with NFPA 80.

D. Protect surfaces from damage or staining. Clean surfaces prior to Date of Substantial Completion.

E. Test and adjust hardware for ease of operation.

End of Section

SECTION 08 7100

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following:
1. Hinges
2. Continuous hinges
3. Key control system
4. Lock cylinders and keys
5. Lock and latch sets
6. Bolts
7. Exit devices
8. Push/Pull units
9. Closers
10. Overhead holders
11. Miscellaneous door control devices
12. Door trim units
13. Protection plates
14. Weatherstripping for exterior doors
15. Sound stripping for interior doors
16. Thresholds

C. Related Sections: The following Sections contain requirements that relate to this Section:
1. Section 01330: Submittals
2. Section 08110: Hollow Metal Doors
3. Section 08210: Wood Doors

D. Products furnished but not installed under this Section to include:
1. Cylinders for locks on entrance doors.
2. Final replacement cores and keys to be installed by Owner.

1.3 REFERENCES:

A. Standards of the following as referenced:
1. American National Standards Institute (ANSI)
2. Door and Hardware Institute (DHI)
3. Factory Mutual (FM)
4. National Fire Protection Association (NFPA)
5. Underwriters' Laboratories, Inc. (UL)
a. UL 10C - Fire Tests Door Assemblies
6. Warnock Hersey

B. Regulatory standards of the following as referenced:
1. Department of Justice, Office of the Attorney General, Americans with Disabilities Act, Public Law 101-336 (ADA).
2. CABO/ANSI A117.1: Providing Accessibility and Usability for Physically Handicap People, 1992 edition.

1.4 SYSTEM DESCRIPTION:

A. Refer to applicable “Headings“ for system description for electric and electro-pneumatic hardware products.

1.5 SUBMITTALS:

A. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements. For items other than those scheduled in the “Headings” of Section 3, provide catalog information for the specified items and for those submitted.

B. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format “hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:
a. Type, style, function, size, and finish of each hardware item.
b. Name and manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of each hardware set, cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
e. Explanation of all abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for hardware.
g. Door and frame sizes and materials.
h. Keying information.

i. Cross-reference numbers used within schedule deviating from those specified.
1) Column 1: State specified item and manufacturer.
2) Column 2: State prior approved substituted item and its manufacturer.

2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

C. Samples of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.
1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.

D. Templates for doors, frames, and other work specified to be factory prepared for the installation of 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.

E. Contract closeout submittals:
1. Operation and maintenance data: Complete information for installed door hardware.
2. Warranty: Completed and executed warranty forms.

1.6 QUALITY ASSURANCE:

A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC), or equivalent, who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
2. Required supplier to meet with installer prior to beginning of installation of door hardware.

C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware shall comply with standards UBC 702 (1997) and UL 10C.

1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

1.7 PRODUCT HANDLING:

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.8 WARRANTY:

A. Special warranties per manufacturer:
1. Door Closers: Twenty-five year period
2. Exit Devices: Ten year period
3. Locksets: Limited lifetime

1.9 MAINTENANCE:

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

B. Parts kits: Furnish manufacturers' standard parts kits for locksets, exit devices, and door closers.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS:
(* Denotes manufacturer referenced in the Hardware Headings)

A. Hinges:
1. Acceptable manufacturers:
a. Bommer
b. PBB*
c. Stanley
2. Characteristics:
a. Templates: Provide only template-produced units.
b. Screws: Provide Phillips flat-head screws complying with the following requirements:
1) For metal doors and frames install machine screws into drilled and tapped holes.
2) For wood doors and frames install threaded-to-the-head wood screws.
3) For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.
4) Finish screw heads to match surface of hinges or pivots.
c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
1) Out-Swing Exterior Doors: Non-removable pins.
2) Out-Swing Corridor Doors with Locks: Non-removable pins.
3) Interior Doors: Non-rising pins.
4) Tips: Flat button and matching plug. Finished to match leafs.
d. Size: Size hinges in accordance with specified manufacturer’s published recommendations.
e. Quantity: Furnish one pair of hinges for all doors up to 5'0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof.

B. Continuous Hinges:
1. Acceptable manufacturers:
a. Markar
b. Select Products*
c. Zero
2. Characteristics:
a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.

b. All hinges are to be manufactured to template. Uncut hinges shall be non-handed and shall be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.
c. Vertical door loads shall be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves shall be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180°.
d. Hinges to be milled then anodized and assembled in matching pairs. Fasteners supplied shall be 410 stainless steel, plated and hardened.
e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors (suffix -FR) shall meet the required ratings without the use of auxiliary fused pins or studs.

C. Pivot Sets:
1. Acceptable manufacturers:
a. ABH*
b. Ives
c. Rixson
2. Characteristics:
a. Pivots to be high strength forged bronze with top pivot housing with spring activated bronze retracting pin. Pivots to have tilt-on bearing and bearing pin.

D. Cylinders:
1. Acceptable manufacturers:
a. Corbin Russwin
b. PDQ*
c. Schlage
2. Characteristics:
a. Review the keying system with the Owner and provide the type required.
b. Equip locksets with manufacturer’s special tumbler cylinder with construction master key feature that permits voiding of construction keying without cylinder removal
c. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
d. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
1) Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, “DO NOT DUPLICATE."
e. Key Material: Provide keys of nickel silver only.
f. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, 5 grandmaster keys for each

grandmaster system, and, if needed, 5 control keys for interchangeable core series.
1) Furnish one extra blank for each lock.
2) Deliver keys to Owner.

E. Locksets, Latchsets, Deadbolts:
1. Acceptable manufacturers:
a. Corbin Russwin
b. PDQ*
c. Schlage
2. Mortise Locksets and Latchsets: as scheduled.
a. Case: mortise design, 13-gauge cold rolled steel mechanism, dichromated for corrosion-resistance.
b. Latchbolt: 3/4” throw. Deadbolt: 1” throw.
c. Lever Trim: accessible design as scheduled.
d. Electric operation: Manufacturer-installed continuous duty solenoid.
e. Strikes: Handed Curve Lip Strike
f. Scheduled Lock Series and Design: MR series, PHL lever design.
g. Certifications:
1) ANSI A156.13, Grade 1

F. Exit Devices:
1. Acceptable manufacturers:
a. Precision
b. PDQ*
c. Von Duprin
2. Characteristics:
a. Exit devices shall be "UL" listed for life safety. All exit devices for fire rated openings shall have “UL" labels for “Fire Exit Hardware."
b. All exit devices mounted on labeled wood doors shall be mounted on the door per the door manufacturer’s requirements.
c. All trim shall be thru-bolted to the lock stile case.
d. All exit devices shall be made of brass, bronze, stainless steel, or aluminum material, powder coated, anodized, or plated to the standard architectural finishes to match the balance of the door hardware.
e. Provide glass bead conversion kits to shim exit devices on doors with raised glass heads.
f. All exit devices shall be one manufacturer. No deviation will be considered.
g. All exit devices shall be non-handed. Touchpad shall extend a minimum of 1/2 of the door width and shall extend to the height of the cross rail housing for a “no pinch” operation. Plastic touchpads are not acceptable. All latchbolts to be the deadlocking type.
h. Surface vertical rod devices shall be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices

shall be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.

G. Closers and Door Control Devices:
1. Acceptable manufacturers:
   a. LCN
   b. PDQ*
   c. Sargent
2. Characteristics:
   a. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
   b. All closers shall utilize a stable fluid withstanding substantial temperature range without seasonal adjustment of closer speed to properly close the door.
   c. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.
   d. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
   e. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.

H. Overhead Door Holders:
1. Acceptable manufacturers:
   a. ABH*
   b. Glynn Johnson
   c. Rixson Firemark
2. Characteristics:
   a. Provide medium duty door holders (concealed and surface mounted) of stainless steel.
   b. Concealed holders to be installed with the jamb bracket mortised flush with the bottom of the jamb. The arm and channel to be mortised into the door.
   c. Surface holders to be installed with the jamb bracket mounted on the stop.

I. Floor Stops and Wall Bumpers:
1. Acceptable manufacturers:
   a. Burns*
   b. Hiawatha
   c. Trimco
2. Characteristics: Refer to Hardware Headings.

J. Door Bolts/Coordinators:
1. Acceptable manufacturers:
   a. Burns*
   b. Hiawatha
   c. Trimco
2. Characteristics:
   a. Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side that fits into a matching guide.
   b. Automatic flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
   c. Self latching flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
   d. Automatic flush bolts and self-latching flush bolts shall be UL listed for fire door application without bottom bolts (LBB).
   e. Coordinator to be soffit mounted non-handed fully automatic UL listed coordinating device for sequential closing of paired doors with or without astragals.
   f. Provide filler pieced to close the header. Provide brackets as required for mounting of soffit applied hardware.

K. Protective Plates:
1. Acceptable manufacturers:
   a. Burns*
   b. Hiawatha
   c. Trimco
2. Characteristics:
   a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
   b. Materials:
      1) Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
   c. Fabricate protection plates not more than 2 inches less than door width on hinge side and not more than 1 inch less than door width on pull side.
   d. Heights:
      1) Kick plates to be 10 inches in height.
      2) Mop plates to be 4 inches in height.
      3) Armor plates to be 36 inches in height. Armor plates on fire doors to comply with NFPA 80.

L. Thresholds:
1. Acceptable manufacturers:
   a. National Guard Products, Inc.*
   b. Reese Industries
   c. Zero Weatherstripping Co., Inc.

2. Types: Indicated in Hardware Headings.

M. Door Seals/Gasketing:
1. Acceptable manufacturers:
   a. National Guard Products, Inc.*
   b. Reese Industries
   c. Zero Weatherstripping Co., Inc.
2. Types: Indicated in Hardware Headings.

N. Silencers:
1. Acceptable manufacturers:
   a. Burns*
   b. Deutscher
   c. Ives
2. Three for each single doors; four for pairs of doors.

O. Key Cabinet and System:
1. Acceptable manufacturers:
   a. MMF
   b. Lund
   c. Telkee, Inc.
2. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150 percent of the number of locks required for the Project.
   a. Provide complete cross index system set up by key control distributor, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
   b. Provide hinged-panel type cabinet for wall mounting.

P. Security Equipment:
1. Acceptable manufacturers:
   a. Dynalock
   b. Security Door Controls
   c. Von Duprin
2. Characteristics:
   a. Provide items as found in Hardware Headings.
3. Coordinate security equipment with Electrical.

2.2 MATERIALS AND FABRICATION:

A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including “prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
4. Do not use thru-bolts or sex bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware, or otherwise found in Headings. Coordinate with wood doors and metal doors and frames where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.3 HARDWARE FINISHES:

A. Match items to the manufacturer’s standard color and texture finish for the latch and lock sets (or push-pull units if no latch of lock sets).

B. Provide finishes that match those established by ANSI or, if none established, match the Architect’s sample.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer’s standards, but in no case less than specified by referenced standards for the applicable units of hardware.

D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."

E. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
   1. Hinges (Exterior): 630 (US32D) Satin Stainless Steel
   2. Hinges (Interior wood doors): 652 (US26D) Satin Chrome Plated Steel
   3. Hinges (Interior metal doors): 600 (USP)
   4. Continuous Hinges: 628 (US28) Clear Anodized Aluminum
   5. Flush Bolts: 626 (US26D) Satin Chrome Plated Brass/Bronze
   6. Locks: 626 (US26D) Satin Chrome Plated Brass/Bronze
   7. Exit Devices: Match adjacent hardware
   8. Door Closers: Match adjacent hardware
   9. Protective Plates: 630 (US32D) Satin Stainless Steel
   10. Door Stops: 626 (US26D) Satin Chrome Plated Brass/Bronze
   11. Overhead Holders: 630 Satin Stainless Steel
   12. Thresholds/Weatherstripping: 627/628 (US27/US28) Aluminum

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
   1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
   2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.
   3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section “Joint Sealers”.

F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING:

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Door Hardware Supplier's Field Service
1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
3. File written report of this inspection to Architect.

D. Prior to project completion, representatives of the lock, exit device and overhead closer manufacturers shall inspect and adjust all units and certify that all units are installed in accordance with the manufacturer’s instructions, and are regulated properly and functioning correctly. A written report shall be provided to the Architect as to the inspection and shall include appropriate certificates.

3.3 HARDWARE SCHEDULE:

HEADING #1

DOORS #: G102

EACH DOOR TO HAVE:

3	HINGES	BB81
1	LOCKSET	MR116
1	DOOR STOP	565
1	SET DOOR SEALS	5050
1	COAT HOOK	604

HEADING #2

DOORS #: G103

EACH DOOR TO HAVE:

3	HINGES	BB81
1	LOCKSET	MR148
1	DOOR STOP	565

HEADING #3

DOORS #: G104

EACH DOOR TO HAVE:

1	CONTINUOUS HINGE	SL18HD
1	EXIT DEVICE	6201R X 04 FUNCTION
2	CYLINDERS	TO MATCH NEW SYSTEM
1	PULLS	M39-1D X 9HD MTG.
1	CLOSER	7101 X DSHO X SCS-1
1	KICK PLATE	KP50 X B4E X CSK
1	THRESHOLD	425
1	SET DOOR SEALS	155S
1	DOOR BOTTOM SEAL	200S
1	DRIP STRIP	17

HEADING #4

DOORS #: G128A, G128B

EACH DOOR TO HAVE:

3	HINGES	4B81
1	EXIT DEVICE	6200R-F 6 EW 08
1	CYLINDER	TO MATCH EXISTING SYSTEM
1	CLOSER	7101RA
1	DOOR STOP	565
1	KICK PLATE	KP50 X B4E X CSK
1	DOOR STOP	565
1	SET DOOR SEALS	5075

HEADING #5

DOORS #: G128, G130

EACH DOOR TO HAVE:

3	HINGES	BB81
1	PRIVACY SET	MR276
1	DOOR STOP	565/522 (AS REQUIRED)
1	COAT HOOK	604

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work:
1. Joint sealants.
2. Aluminum-framed entrances and storefronts.

1.2 PERFORMANCE REQUIREMENTS:

A. Delegated design: Engage a professional engineer registered in the state of Georgia, to design glazing.

B. Performance requirements:
1. Wind loads: Comply with wind load criteria specified in Aluminum-Framed Entrances and Storefronts section.
2. Thermal insulated units: Units shall comply with the requirements of ASTM E2190-10 and be certified by Associated Laboratories, Inc., (ALI) or Insulating Glass Certification Council (IGCC) for Class A.
3. Tempered and heat-treated glass:
a. Glazing materials, whether in monolithic state or as a lite of a thermal insulated unit, shall be tempered or otherwise heat-treated where required by glass manufacturer's design calculations to resist stress caused by glass orientations, sizes and configurations, heat stress, inherent imperfections, wind loading, glazing conditions, temperature differential, inside window treatments or other conditions affecting breakage probability.
b. Orient lites with roll distortion parallel to head and sill members.
c. Maximum allowable breakage probability at design loads shall be eight lites per thousand for vertical glazing.
4. Safety glazing: Tempered glazing materials shall comply with safety glazing requirements of CPSC 16-CFR, Part 1201, Category II, with testing requirements of ASTM C1048-12, and with code requirements for locations of safety glazing.
5. Performance characteristics: Meet energy code requirements.

1.3 SUBMITTALS:

A. Samples: Submit minimum 1'-0" by 1'-0" samples of each type glazing material proposed for use, if requested by Architect.

B. Product data: Submit for each type of glazing material and accessory product specified. Include technical data, storage and handling procedures and performance characteristics.

C. Framing manufacturer's approval: Prior to submission of shop drawings, indicate by letter that an authorized representative of storefront framing manufacturer has reviewed and approved details, including glass bite, clearances and glazing methods.

D. Calculations: Submit for Architect's information only.
   1. Submit calculations prepared by glazing material manufacturer indicating recommendations for glass thickness and heat treating of glazing materials as a result of heat stress, building orientation, inside window treatments, shading by exterior building components or wind loading.
   2. Identify factors affecting breakage probability which have been taken into consideration and breakage probability anticipated by calculations.

E. Maintenance data: Submit glazing material manufacturer's maintenance data for cleaning and care of each type of glazing material.

F. Delegated-design submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the registered professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE:

A. Applicable standards:
   1. American National Standards Institute (ANSI), "Safety Performance Standards and Methods of Tests for Safety Glazing Materials used in Buildings," Z97.1.
   2. ASTM International (ASTM), standards as referenced herein.
   3. Consumer Product Safety Commission (CPSC), "Safety Standard for Architectural Glazing Materials," 16-CFR, Chapter II, Part 1201.
   4. Glass Association of North America (GANA) "Glazing Manual".

B. Labeling. Safety glazing: Permanently mark safety glazing with a certification label of a certifying agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Pre-glazing conference:
   1. Prior to beginning glass and glazing work, a preglazing conference will be held to review work to be accomplished.
   2. Contractor, Architect, storefront supplier and erector, a representative of glass manufacturer, a representative of sealant manufacturer and glazing subcontractor will be present.
   3. Contractor shall notify all parties at least seven days prior to time of conference.
   4. Material submitted by Contractor, interfacing of glass and glazing and window wall work, dimensions and tolerances, sealant joint widths and depths shall be reviewed.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Store glazing materials indoors in cool, dry area, off floor, supported to prevent stress and breakage.

B. Move no cases which have been partially unpacked. Unpack glazing materials in accord with manufacturer's product data for type of material being handled. Stack individual lites as recommended by manufacturer's product data.

C. Utilize rolling blocks to rotate glazing materials.

D. Handle insulated units without rotating, warping or "cartwheeling" units. Prevent damage to glazing material or edge seal.

1.6 WARRANTIES:

A. Thermal insulated units: Warrant from failure due to loss of edge seal for a period of ten years, beginning at Date of Substantial Completion.

B. Glass replacement warranty: Include a two-year warranty covering glazing materials and labor to replace glazing damaged for any reason other than natural disasters, vandalism or damage resulting from accident or abuse arising out of Owner's operations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable float glass manufacturers; subject to compliance with specified requirements:
1. AGC Flat Glass North America.
2. Guardian Industries Corp.
3. Nippon Sheet Glass Co., Ltd., Pilkington.
4. PPG Industries, Inc./Glass Group.

B. Acceptable glass unit fabricators; subject to compliance with specified requirements:
1. Oldcastle Building Envelope.
2. Trulite Glass & Aluminum Solutions (formerly Arch Aluminum and Glass and Vitro America.)
3. Viracon, Inc.

C. Acceptable low-emissivity (Low-E) glass fabricators; subject to compliance with specified requirements:
1. AGC Flat Glass North America.
2. Guardian Industries Corp.
3. Nippon Sheet Glass Co., Ltd. Pilkington.
4. Oldcastle Building Envelope.
5. PPG Industries, Inc./Glass Group.
6. Viracon, Inc.

2.2 GLAZING MATERIALS:

A. General flat glass standard: Comply with ASTM C1036-11 as follows:
1. Transparent flat glass, clear: Type I, Class 1-Clear, Quality - Q3.

B. Tempered monolithic glass: 1/4" thickness, fully tempered, complying with ASTM C1048-12.

C. Thermal insulated units:
1. Tempered units:
a. Inboard lite: Clear color, tempered float glass; 1/4" thickness.
b. Outboard lite: Clear color, tempered float glass; 1/4" thickness. Provide Low-E coating on #2 surface.
c. Unit thickness: 1" minimum.

2.3 GLAZING SEALANTS:

A. General:
1. Compatibility: Provide 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. Sealant shall have a VOC content of 250 g/L or less.

2.4 GLAZING ACCESSORIES:

A. Setting blocks: Neoprene, 70-90 Shore A durometer hardness, meeting ASTM C864-05(2011).

B. Edge blocks: Neoprene, 60-70 Shore A durometer hardness, meeting ASTM C864-05(2011).

C. Spacers: Neoprene, 40-50 Shore A durometer hardness, meeting ASTM C864-05(2011).

D. Glazing gaskets: Premium quality sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers. Gaskets shall be as recommended by framing system manufacturer to meet specified framing system performance criteria and framing system warranty requirements.
1. Dense compression gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
a. Neoprene complying with ASTM C864-05(2011).
b. EPDM complying with ASTM C864-05(2011).
c. Silicone complying with ASTM C1115-06(2011).
d. Thermoplastic polyolefin rubber complying with ASTM C1115-06(2011).
2. Soft compression gaskets:
a. Type: Extruded or molded, closed-cell, integral-skinned neoprene, EPDM, silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C509-06(2011), Type II, black; of profile and hardness required to maintain watertight seal.
b. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.
3. Gasket reglets: Extruded black rigid polyvinyl chloride.

E. Polyvinyl chloride foam tape for interior glazing: Closed cell self-adhesive tape meeting ASTM D1667-05(2011).

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Verify compliance with the following requirements prior to beginning glazing work:
1. That framing is anchored in position, plumb and square within 1/8" of nominal dimensions indicated.
2. That fastener heads, and other projections are removed from glazing rabbets.
3. That corners and fabrication intersections are sealed and framing is weathertight.
4. That rabbets at sills weep to outside and rabbets are of sufficient depth and width to receive glazing material and provide the required bite of the glazing material.
5. That hollow metal frames have received paint finish in accord with Painting and Coating section.

3.2 PERFORMANCE REQUIREMENTS:

A. Install glazing materials to obtain airtight and watertight installation and to withstand normal temperature changes and wind loads without failure.

B. Protect glazing material faces and edges during handling and installation.

C. Size glazing materials for each opening to ensure correct bite on glazing material, without imposing strain, in accord with manufacturer's product data.

D. Maintain minimum bed clearance between glazing material and sash of 1/8", both sides, except where greater clearance is required by either glazing material or framing manufacturer.

3.3 PREPARATION OF SURFACES:

A. Clean glass edges and framing glazing channel of debris and protective coatings immediately prior to glazing. Use material acceptable to framing, glazing material and glazing sealant manufacturers.

B. Inspect glazing material prior to installation. Eliminate lites having face or edge damage.

C. Lites of tempered and insulated glass shall not be cut or otherwise altered in the field.

3.4 GLAZING PROCEDURES:

A. Install glazing materials in accord with manufacturer's product data and applicable standards, except where more stringent requirements are specified.

B. Install setting blocks for glazing materials over six sq. ft. in area. Install at sill rabbet at quarter points. Size setting blocks in proportion to glass weight; minimum 4" length.

C. Shim lites over 100 united inches, inboard and outboard, on all sides using continuous shims, except where gaskets accomplish shimming.

D. Provide edge blocks at vertical jambs to prevent lateral movement of glass. Provide edge blocks at 3" minimum length. Maintain 1/8" clearance between edge of glass and edge block.

E. Glazing gaskets (dry): Install gaskets in accord with framing system manufacturer's installation requirements, to meet specified framing system performance criteria and framing system watertight warranty.
   1. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
   2. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place. Joints shall be shall be miter cut and bonded together.
   3. Installation with drive-in wedge gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gaskets 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.
   4. 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.
   5. Install gaskets so they protrude past face of glazing stops.

F. Glazing sealant installation: Comply with applicable provisions of Joint Sealants section. Prevent filling of weep holes with sealant.

G. Interior channel glazing: Glaze using polyvinyl chloride tape applied to both sides, all stops. Place tape, with butted joints. Compress tape approximately 30 percent. Center glazing material in rabbet.

3.5 PROTECTION AND CLEANING:

A. For glazing materials subject to damage during construction, protect from breakage by attachment of crossed streamers to framing. Do not mark on surfaces.

B. Remove and replace broken, cracked, chipped or otherwise damaged glazing materials and materials not meeting specified design criteria prior to Date of Substantial Completion.

C. Final cleaning: Just prior to Date of Substantial Completion, clean glass inside and out. Clean using pre-tested detergent and water. Flush with clean water. Repair or replace work which cannot be cleaned or which has been damaged during construction operations.

End of Section

SECTION 08 9119

FIXED ALUMINUM LOUVERS

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS:

A. Delegated design: Design louvers, including comprehensive engineering analysis by a professional engineer registered in the state of Georgia, using structural and seismic performance requirements and design criteria indicated.

B. Structural requirements: Design all materials to withstand wind and snow loads as required by the applicable building code. Maximum allowable deflection for the louver structural members shall be l/180 or 0.75 inch, whichever is less. Maximum allowable deflection for the louver blades shall be l/120 or 0.50 inch across the weak axis, whichever is less.

1.2 SUBMITTALS:

A. Product data: Indicate performance test results, material types, thicknesses, finishes and sizes, fabrication and installation details.

B. Design criteria: Submit performance data for louvers, certifying compliance with AMCA Standard 500-L, test procedures for pressure drop and water penetration performance.

C. Shop drawings:
1. Indicate louver material, design and construction, with sections. elevations and specific details. Indicate mullion locations.
2. Show methods of attachment to adjacent surfaces.
3. Include structural and performance calculations.
4. Shop drawings and structural calculations to be signed and sealed by a professional engineer licensed to practice in the State of the project.

D. Samples: Submit color samples for Architect’s initial and final color and finish selections.

E. Delegated-design submittal: For louvers indicated to comply with structural and seismic performance requirements, including analysis data signed and sealed by the registered professional engineer responsible for their preparation.

1.3 QUALITY ASSURANCE:

A. Applicable standards; standards of the following, as referenced herein:
1. The Air Moving and Conditioning Association (AMCA).
2. Aluminum Association (AA).
3. American Architectural Manufacturers Association. (AAMA).
4. ASTM International (ASTM).

1.4 PROJECT/SITE CONDITIONS:

A. Protection: Protect pre-finished surfaces from damage and staining. Provide protective covering for louvers during subsequent construction.

B. Coordinate installation of louvers to be built into building structure. Secure templates and lay out to rough dimensions furnished by manufacturer.

1.5 WARRANTY:

A. Finish warranty: Warrant fluoropolymer coating to remain free of checking, crazing, peeling, chalking or fading for a period of 20 years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LOUVERS:

A. Acceptable manufacturers; subject to compliance with specified requirements:
1. Basis of design: Construction Specialties, Inc.
2. Airline Louvers, a Nystrom Building Products Company.
3. Airolite Corp./Greenheck Corp.
4. All-Lite Architectural Products Div./PCI Industries.
5. American Warming & Ventilating, Inc.
6. Dowco Products Group.
7. Greenheck Corp.
8. Industrial Louvers, Inc.
9. Ruskin Co.

B. Basis of design: Construction Specialties Storm Resistant Fixed Horizontal Louver RS-4300 inverted “V” shaped, fixed horizontal blades, 4" deep.
1. Certification: AMCA certified, meeting AMCA 511, minimum 95% effective when tested with a 29 mph wind velocity and 3"/hour rainfall rate.
2. Material: 6063-T5 or 6063-T6 aluminum alloy, meeting ASTM B221-14, 0.075" minimum thickness.
3. Free area: Minimum 46%.

C. Finish on exposed aluminum components:
1. Provide one of the following finishes:
a. Two coat, shop-applied, baked-on, fluoropolymer coating system based on minimum 70% Arkema Group, Kynar 500 or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.
b. Powder coating: Shop-applied 1.5 to 3 mil thickness full strength 100% resin fluoropolymer powder coating meeting AAMA 2605, with a 4H hardness rating. Finish shall allow zero VOCs to be emitted into facility of application.
2. Color: As selected by Architect from manufacturer’s full range.
3. Unexposed aluminum components: Mill finish.

D. Screening: Bird screen in extruded aluminum frame.

E. Mullions: Provide as indicated on approved shop drawings, of same material and finish as louvers.

F. Sill pieces: Form of same material and finish as louvers.

G. Blank-off panels: 0.050” thickness aluminum sheet, finished to match louvers.

H. Accessory products:
1. Fasteners: Stainless steel of type required to attach to substrates encountered.
2. Bituminous paint: Cold-applied asphalt emulsion for separation of dissimilar materials complying with ASTM D1187-97(2011), minimum 30 mils dry film thickness per coat.

I. Fabrication:
1. Provide louvers, bird screens, blank-off panels, structural supports and accessories as specified and/or shown on approved shop drawings. Materials, sizes, depths, arrangements and material thickness shall be as indicated or as required for optimal performance with respect to strength; durability; and uniform appearance.
2. Louvers shall be mechanically assembled using stainless steel or aluminum fasteners.
3. Include supports, anchorage, and accessories required for complete assembly.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Coordination:
1. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
2. Coordinate weather resistant elements at exterior louvers.
3. Coordinate size and location of blankoff panels with mechanical duct locations.

3.2 INSTALLATION:

A. Install louvers plumb, level and true, in accord with manufacturer’s installation instructions, approved shop drawings and product data, in prepared openings. Attach louvers using stainless steel fasteners at head, sill and jambs, with fasteners spaced as shown on shop drawings.

B. Louvers:
1. Verify dimensions of supporting structure at the site by accurate field measurements so that the work will be accurately designed, fabricated and fitted to the structure.
2. Anchor louvers to the building substructure as indicated on architectural drawings.
3. Erection Tolerances:
a. Maximum variation from plane or location shown on the approved shop drawings: 1/8" per 12 feet of length, but not exceeding 1/2" in any total building length or portion thereof (non-cumulative).
b. Maximum offset from true alignment between two members abutting end to end, edge-to edge in line or separated by less than 3": 1/16" (shop or field joints). This limiting condition shall prevail under both load and no load conditions.
4. Cut and trim component parts during erection only with the approval of the manufacturer or fabricator, and in accordance with his recommendations. Restore finish completely. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly.

5. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.
6. Set units level, plumb and true to line, with uniform joints.

C. Separate aluminum from dissimilar metals, concrete, stucco and masonry using minimum 30 mils dry film thickness bituminous paint.

End of Section

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work:
1. Rough carpentry.
2. Architectural woodwork.
3. Tiling.
4. Acoustical ceilings.
5. Painting and coating.
6. Mechanical.
7. Electrical.

1.2 SUBMITTALS:

A. Product data: Indicate product description, including compliance with specified requirements and installation requirements. Include specific requirements for fire-rated and acoustically rated partitions. Mark manufacturer's brochures to include only those products proposed for use. Include details for supplementary fire protection at penetrations and locations of acoustical sealant.

B. Evaluation reports: For embossed steel studs and runners and firestop tracks, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.3 QUALITY ASSURANCE:

A. Applicable standards; standards of the following:
1. American National Standards Institute (ANSI).
2. ASTM International (ASTM) as referenced herein.
3. Association of the Wall and Ceiling Industries - International (AWCI).
4. Ceilings and Interior Systems Construction Association (CISCA).
5. Gypsum Association (GA).
6. Steel Stud Manufacturers Association (SSMA).
7. Underwriters Laboratories, Inc. (UL).
8. Intertek Testing Services/Warnock Hersey, Inc. (WHI).
9. “Recommended Specification: Levels of Gypsum Board Finish” as published jointly by the Gypsum Association, AWCI, CISCA and PDCA.
10. Painting and Decorating Contractors of America (PDCA).

B. Design criteria:
1. Sound rating: Construct designated partitions in accord with manufacturer's product data, as submitted, for obtaining Sound Transmission Class (STC) ratings as indicated on drawings, in accord with ASTM E90-09.
2. Fire-resistance: Comply with fire-resistance designs indicated on drawings. Use only manufacturers and types of materials as required by indicated designs. Designs with tests by other than Testing Agency listed may be submitted for Architect's acceptance, subject to prior acceptance by governing authorities.
3. Seismic performance: Comply with code requirements.

C. Preinstallation meetings:
   1. Conduct meetings at project site with Architect, Contractor, gypsum board installer and installers of other related products in attendance.
   2. Review details of gypsum board installation, including finishing of gypsum board and location of control joints.

D. Jobsite mock-up:
   1. Provide mockups for appearance areas finished to a Level 3, or 4 as described herein.
   2. Mock-ups shall be minimum of at least 100 sq. ft.in surface areaand shall represent the requirements found in the specified Level of Finish, the location within the building, and shall include texture and/or other decorative finishes such a final paint, wall covering, trim, or other wall treatments.
   3. Mockups shall demonstrate aesthetic effects and set quality standards for materials and execution.
   4. Build mockups for the following:
      a. Each level of gypsum board finish indicated for use in exposed locations.
      b. Each texture finish indicated.
   5. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
   6. Simulate finished lighting conditions for review of mockups.
   7. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at date of Substantial Completion.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Delivery: Deliver materials in original packages, containers or bundles bearing brand name, applicable standard designation and name of manufacturer or supplier.

B. Storage:
   1. Stack gypsum board inside building under roof, off floor on pallets or similar platforms providing continuous support for gypsum board and to prevent sagging. Stack gypsum board flat and so that long lengths are not over short lengths.
   2. Protect gypsum board from direct exposure to rain, snow, sunlight or other excessive weather conditions.
   3. Protect ready-mixed joint compounds against freezing, exposure to extreme heat and direct sunlight at all times.
   4. Do not overload floor systems.

1.5 PROJECT/SITE CONDITIONS:

A. Do not install gypsum board until installation areas are enclosed.

B. Environmental limitations: Comply with ASTM C840-13 requirements and gypsum board manufacturer's written recommendations, whichever are more stringent.
   1. During mechanical application of gypsum board, maintain room temperature at not less than 40 degree F.
   2. During joint treatment and decoration, maintain room temperature not less than 50 degrees F for 48 hours prior to application and continuously thereafter until completely dry and until permanent heating system is in operation or building is occupied.

3. When temporary heat source is used, temperature shall not exceed 95 degree F in any given room or area.

C. Do not install boards that are wet, those that are moisture damaged, and those that are mold damaged.
1. Indications that boards are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that boards are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

D. Ventilation: Comply with ASTM C840-13 requirements and gypsum board manufacturer's written recommendations, whichever are more stringent.
1. Provide ventilation during and following joint treatment applications, and drying and curing periods.
2. Use temporary air circulators in enclosed areas lacking natural ventilation.
3. Under slow drying conditions, allow additional drying time between coats of joint treatment.
4. Protect installed materials from drafts during hot, dry weather.

E. When recommendations of manufacturer’s product data exceed the above, comply with requirements of manufacturer’s product data.

PART 2 - PRODUCTS

2.1 FRAMING MEMBERS:

A. Gypsum board studs: Meeting requirements of ASTM C645-14; channel type, roll-formed from hot dip galvanized steel only; complying with ASTM A1003-15 and with ASTM A653-13, G40 minimum. No EQ coatings permitted.
1. Stud size: As indicated on drawings, except minimum 3-5/8" depth where partition is indicated to receive tile finish.
2. Stud gauge: As required by manufacturer's product data and ASTM C754-15 for limiting heights, structural determinations, and conditions of use, with maximum allowable deflections as follows:
a. Ground floor lobbies, excluding those with tile finishes:
1) Non-structural studs: Minimum L/120 at 10 psf in accord with ASTM C645-14.
2) Structural studs: Minimum L/120 at 20 psf in accord with ASTM C955-11c.
b. Partitions to receive tile finishes:
1) Non-structural studs: Minimum L/360 at 10 psf using 20 ga. or heavier studs, in accord with ANSI A108.11 and ASTM C645-14.
2) Structural studs: Minimum L/360 at 20 psf using 20 ga. or heavier studs, in accord with ANSI A108.11 and ASTM C955-11c.
c. Other partitions: Meet code requirements.
3. Comply with submitted design calculations.

B. Floor and ceiling runners: Hot dip galvanized steel, minimum 1" deep, same width as studs, same gauge as studs. Runner tracks shall have slotted holes for attachment to structure and studs, for slip joints where required by manufacturer’s product data.

C. Deflection tracks: Minimum 20 gauge hot dip galvanized steel, deep leg type with slotted flange width of 2-1/2" minimum, allowing vertical movement of up to 1-1/2". Track shall be same nominal depth as studs with allowance for deflection of standard deep leg track.

2.2 GYPSUM BOARD:

A. Mold and moisture resistant board: Treated paper-faced gypsum board.
   1. Acceptable products:
      a. American Gypsum, M-Bloc Type X Gypsum Board.
      b. Continental Building Products, Mold Defense Type X.
      c. CertainTeed, M2Tech Moisture & Mold Resistant Gypsum Board.
      d. Georgia-Pacific, ToughRock Fireguard X Mold-Guard Gypsum Board.
      e. National Gypsum, XP Fire-Shield Gypsum Board.
      f. USG Corporation, USG Sheetrock Brand Mold Tough.
   2. Thickness: 5/8" thickness Type X Grade fire-rated board, tapered edges.
   3. Description: Mold and moisture resistant gypsum core encased in mold and moisture resistant facers, with tapered long edges. Panels shall comply with ASTM C1396-14a.
   4. Mold resistance: Resistant to mold growth when tested in accord with ASTM D3273-12, score of 10.
   5. Water absorption: Less than 5% of board weight when tested in accord with ASTM C473-12.
   6. Joint tape: As recommended by gypsum board manufacturer.
   7. Limitations: Do not use as a tile backer board.

B. Regular board: Meeting ASTM C1396-14a, 5/8" thickness, tapered rounded edges.

C. Fire-retardant board: Meeting ASTM C1396-14a, Type X, 5/8" tapered rounded edges.

2.3 SOUND CONTROL MATERIALS:

A. Contractor's option: Based on sound ratings and fire-resistance ratings required for assemblies, Contractor may select glass fiber or mineral wool sound attenuation materials as follows:
   1. Glass fiber sound attenuation batts:
      a. Acceptable manufacturers:
         1) CertainTeed Corp.
         2) Knauf Insulation.
         3) Johns Manville Corp.
         4) Owens-Corning Corp.
      b. Characteristics:
         1) Type: Unfaced fiberglass batts for friction fit between studs, complying with ASTM C665-15, Type 1.
         2) Surface burning characteristics: Maximum 25 flame spread and 50 smoke development when tested in accord with ASTM E84-15.
         3) Assembly STC: As indicated on drawings.
         4) Thickness: As indicated on drawings.
   2. Mineral wool sound attenuation blankets:
      a. Acceptable manufacturers:
         1) IIG, MinWool, LLC, MinWool Sound Attenuation Fire Batts.
         2) Owens-Corning Corp., Sound Attenuation Fire Batt.
         3) USG Corporation, Thermafiber SAFB (Sound Attenuation Fire Blankets).

b. Characteristics:
1) Type: Paperless, semi-rigid mineral wool fiber blanket complying with ASTM C665-15, Type 1.
2) Density: Maximum 4.0 pcf for 1" thickness, and maximum 2.5 pcf. for greater thicknesses.
3) Surface burning characteristics: Maximum 15 flame spread and 5 smoke development when tested in accord with ASTM E84-15.
4) Assembly STC: As indicated on drawings.
5) Thickness: As indicated on drawings.

B. Acoustical tape: Closed cell polyvinyl chloride foam tape, 1/4" thickness by 1" wide.

C. Acoustical Joint Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C834-14. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90-09.
1. Acceptable products:
a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
b. Grabber Construction Products; Acoustical Sealant GSC.
c. Pecora Corporation; AC-20 FTR and AIS-919.
d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
e. USG Corporation; USG Sheetrock Brand Acoustical Sealant.
2. Sealant shall have a VOC content of 250 g/L or less.

2.4 FASTENERS:

A. Expansion anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488/E 488M conducted by a qualified testing agency.

B. Power-actuated anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

C. Fasteners for metal framing, corrosion-resistant:
1. For fastening framing members to concrete and masonry surfaces: Fasteners shall be beaded drive pins or threaded studs driven by powder actuated tools. Fasteners shall resist design loads in accord with requirements of ASTM E1190-11.
2. For fastening to metal decking and for fastening framing members together: Type S, pan head screws, in sizes recommended by gypsum board manufacturer for applications indicated.
3. Provide slotted, stand-off washers for slip joint attachments.

D. Screws for gypsum board and accessory application: Meeting ASTM C1002-14, corrosion-resistant.
1. For application of single layer or base layer of gypsum board to metal framing: 1", Type S, bugle head.
2. For application of face layer of gypsum board to metal framing in double layer construction: 1-5/8", Type S, bugle head.
3. For gypsum board to gypsum board application: 1-1/2", Type G, bugle head.

4. For application of single layer and base layer of gypsum board to wood framing: 1-1/4", Type W, bugle head.

2.5 JOINT MATERIALS:

A. Standard gypsum board products:
1. Joint tape: Meeting ASTM C475-12, perforated paper type.
2. Joint compound: Meeting ASTM C475-12, ready-mixed tape embedment and topping compounds, vinyl-based.

B. Mold and moisture resistant paper faced gypsum board: Joint tape and joint compound shall be in accord with recommendations of board manufacturer's product data.

2.6 SUSPENDED GYPSUM BOARD FURRING SYSTEM:

A. Acceptable manufacturers:
1. Armstrong World Industries, Inc.
2. Chicago Metallic Corp.
3. USG Corporation.

B. Characteristics:
1. Structural classification: Meeting ASTM C635-13a, Heavy Duty.
2. Components: Fabricated from minimum 0.018" base metal thickness, galvanized, cold-rolled steel; double web design.

2.7 INSTALLATION ACCESSORIES:

A. Accessories shall comply with ASTM C1047-14a and shall be as follows.

B. Furring channels: Minimum 25 ga. galvanized steel, 7/8" deep by 1-3/8" face width.

C. Resilient channel: Galvanized steel, manufacturer's standard type.

D. Furring brackets: Minimum 20 ga. galvanized steel, for attaching 3/4" furring channels to masonry walls.

E. Ceiling hangers: Minimum eight ga. galvanized annealed steel wire.

F. Tie wire: Minimum 18 ga. galvanized, annealed steel wire.

2.8 TRIM ACCESSORIES:

A. One of the following:
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Approved plastic trim manufacturers:
a. Plastic Components, Inc.
b. Trim-TEx Drywall components.
c. Vinyl corp.

B. Accessories shall comply with ASTM C1047-14a and ASTM D3678-14.

C. Corner beads: 1-1/4" wide perforated flanges.

D. Jamb, ceiling and casing trim: Manufacturer's standard "L" and "U" shaped members with expanded metal or perforated flanges; "mud-in" type for finishing with joint compound.

E. Control joints: Control joint shall be designed to be applied after wallboard is installed. Expanded metal or perforated flanges shall accept joint compound for a flush finish. Control joints shall provide stress relief and shall assist in controlling cracking in large areas of wallboard.

PART 3 - EXECUTION

3.1 FRAMING AND FURRING INSTALLATION:

A. Except where more stringent requirements are specified, install framing and furring in accord with ASTM C754-15, Gypsum Association requirements and manufacturer’s product data.

B. Runners:
1. Attach runner tracks at floor and underside of structural deck with specified fasteners. Provide slip joint attachments to meet deflection criteria and manufacturer’s calculations at the following locations:
a. Tall partitions.
b. Full-height, floor-to-floor or floor-to-deck partitions.
c. All partitions subject to deflection.
2. Where partitions are indicated to stop at finish ceiling, attach to ceiling suspension system using 1/8" toggle bolts or sheet metal screws spaced at 1'-4" o. c., maximum, where partition aligns with ceiling grid. Where partition does not align with grid, attach at each intersection with grid.

C. Studs:
1. Position full length studs vertically, engaging floor and ceiling runners.
a. Space studs as indicated on drawings.
2. Provide double studs at interior and exterior corners, expansion joints, partition termination and adjacent to door and borrowed lite openings in partitions. Locate next stud not more than 6" from double studs.
3. Secure abutting and intersecting walls with fasteners through stud flanges.
4. For horizontal reinforcement at door and borrowed lite frames, install cut-to-length runner sections with slit flanges secured to studs.
5. Install acoustical tape on metal studs which abut other studs or dissimilar surfaces in walls to receive sound attenuation blankets.

D. Furring:
1. Attach to masonry substrate with fasteners spaced at 2'-0" o. c. on alternating furring channel flange.
2. Position channels vertically, spaced at 1'-4" o. c., maximum.

3.2 SUSPENDED GYPSUM BOARD FURRING SYSTEM INSTALLATION:

A. Install suspension system in accord with ASTM C754-15.

B. Seismic bracing: Comply with details and spacing indicated on drawings.

C. Hangers:
1. Space hangers at 4'-0" o. c., maximum, in each direction. Secure to building structure.

2. Install additional hangers at ends of each suspension member and at each corner of lighting fixtures.
3. Splay wires no more than 5" in 4'-0" vertical drop.
4. Wrap wire minimum of three times horizontally, turning ends upward.

D. Space main tees at 4'-0" o. c., perpendicular to structure. Space cross tees at 2'-0" o. c., perpendicular to main tees to form 2'-0" by 4'-0" grid system.

E. Level and square suspension system within specified tolerances.

F. Where grid system exists in an unrestrained condition, brace back to building structure using hanger wire, main tee or carrying channel braces spaced at 4'-0" o. c., maximum.

3.3 GENERAL BOARD APPLICATION:

A. Except where more stringent requirements are specified, install gypsum board in accord with ASTM C840-13, GA-216 and manufacturer's product data.

B. Use gypsum board of maximum lengths to minimize end joints. Stagger end joints.

C. Abut gypsum boards without forcing. Fit ends and edges of board. Do not place butt ends against tapered edges.

D. Support ends and edges of gypsum board on framing or furring members, except for face layer of double layer work.

E. Install gypsum board accessories in accord with gypsum board manufacturer's product data and as follows:
1. Control joints: Install in walls, ceilings and soffits at locations acceptable to Architect and as follows:
   a. Where a wall, ceiling or soffit traverses a construction joint in the base building structure.
   b. Where ceiling and soffit framing members change direction.
   c. Where wall length exceeds 30 lineal feet.
   d. Interior ceilings with perimeter relief: At maximum 50'-0" o.c. in both directions.
   e. Interior ceilings without perimeter relief: At maximum 30'-0" o.c. in both directions.
   f. Where approved by Architect for visual effect.
   g. Full height wall or partition door frames may be considered a control joint.
   h. Where control joints occur in fire rated partitions, comply with code requirements and gypsum board manufacturer's product data.
2. Corner bead: Install at external corners.
3. Metal trim shapes: At exposed edge of gypsum board at door and window openings, at intersections with other materials and at intersection of walls with ceilings.
4. Install corner beads and metal trim shapes to framing system with mechanical anchors.

F. Install acoustical sealant at sound-rated partitions:
1. Seal partition perimeter with continuous 1/4" minimum round bead of acoustical sealant applied to each leg of runners, including those used at partition intersections with dissimilar wall construction.
2. Install gypsum board with 1/8" perimeter relief compressing sealant to form permanent airtight seal.

3. Where slip joint attachments are required at top of partition, fill resulting joint between drywall and adjacent structure with acoustical sealant to form permanent air tight seal.
4. Apply acoustical sealant around cutouts such as at electrical boxes, plumbing penetrations, medicine cabinets, heating ducts and cold air returns to form permanent airtight seal. (Sealant shall not be used as a fire stopping material.)

G. Install sound attenuation blankets at locations indicated on drawings. Comply with manufacturer's product data for installation. Attach flanges of blanket to web of stud and not to face of stud receiving gypsum board.

H. For fire-rated and acoustically rated construction, comply with requirements of tested assemblies scheduled on the drawings.

I. Continue required components of fire-rated and acoustically rated wall assembly to overhead structure. Apply joint tape and one coat of compound to gypsum board joints concealed from view in completed work.

J. Seal openings and penetrations in fire-rated construction as specified in Firestopping section.

K. Attach gypsum board to resilient channels with screws of length to not contact framing.

L. Allowable tolerances in framed gypsum board construction.
1. Position: ±1/4" maximum variation from design position.
2. Alignment: 1/8" in 8'-0"; 1/4" maximum in any continuous wall, line or surface.
3. Surface plane: 1/8" in 12'-0"; 1/16" in 1'-0", maximum variation in true surface plane.
4. Surface smoothness: No joint or fastener location, roughness or blemish discernible after application of finish when viewed at any angle from a distance of 5'-0" under occupancy lighting conditions, with surface preparation as specified in Painting and Coating section.

M. Allowable tolerances in suspended gypsum board furring system ceilings:
1. Deflection: Suspension system components, hangers and fastening devices supporting lighting fixtures, ceiling grilles and acoustical units shall have maximum deflection of 1/360 of span when tested in accord with ASTM C635-13a.
2. Bow, camber and twist: Not exceeding tolerances established by ASTM C635-13a.
3. Variation from level in finished ceiling: ±1/8" in 12'-0".
4. Variation in plane of adjacent gypsum board panels prior to joint treatment: 1/16".

3.4 SINGLE LAYER APPLICATION:

A. Ceilings: Apply gypsum board with long dimension at right angles to framing. Terminate edges of gypsum board running parallel to framing on framing members.

B. Walls:
1. Apply gypsum board vertically or horizontally at Contractor's option, except as required by gypsum board manufacturer's product data for system designs, including fire-rated and acoustically-rated partitions.
2. Stagger end joints in opposite sides of partitions.

3. Terminate edges of gypsum board running parallel to framing, furring on framing or furring members.

C. Fastening: Attach gypsum board using fasteners specified at spacings required by manufacturer's product data.

3.5 DOUBLE LAYER APPLICATION:

A. Base layer:
1. Ceilings: Apply base layer with long dimension at right angle to framing. Terminate edges of gypsum board running parallel to framing on framing members.
2. Walls: Apply base layer vertically. Terminate edges of gypsum board running parallel to framing, furring on framing or furring members. Stagger vertical joints on opposite sides of partitions.
3. Fastening: Attach gypsum board using fasteners specified, at spacings required by manufacturer's product data.

B. Face layer:
1. Apply face layer at right angle to base layer with minimum 10" offset in parallel base and face layer joints.
2. Fastening: Attach gypsum board using fasteners specified, at spacings required by manufacturer's product data.

3.6 JOINT TREATMENT:

A. Finish Levels shall be in accord with the “Recommended Levels of Finish for Gypsum Board, Glass Mat and Fiber-Reinforced Gypsum panels”, GA-214-2015, as published jointly by the Gypsum Association, AWCI, CISCA, DFC and PDCA.

B. Finish Level 0; temporary construction: No taping, finishing, or accessories required.

C. Finish Level 1; joint treatment in smoke barrier applications and areas not normally open to public view such as plenum areas above ceilings, attics, and other areas where the assembly would generally be concealed:
1. Joints and interior angles shall have tape embedded in joint compound.
2. Excess joint compound, tool marks and ridges are acceptable.
3. Accessories are optional unless specified or indicated in the contract documents.

D. Finish Level 2; where board products are used as a substrate in storage ereas, or other similar areas where surface appearance is not a concern.
1. Joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over joints and interior angles. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
2. Fastener heads and accessories shall be covered with one (1) coat of joint compound.
3. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

E. Finish Level 3: Not used.

F. Finish Level 4; Appearance areas where smooth wall designs are decorated with flat paints, light textures, non-continuous textures, or where wall coverings are to be applied:
   1. Joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with a joint knife leaving a thin coating of joint compound over joints and interior angles.
   2. Apply two (2) separate coats of joint compound over flat joints and apply one (1) separate coat of joint compound over interior angles.
   3. Cover fastener heads and accessories with three (3) separate coats of joint compound.
   4. Surface shall be smooth and free of tool marks and ridges.
   5. Jobsite mock-up(s) shall be used to determine acceptance of the finish within the building.

G. Finish Level 5: Not used.

H. Fastener pop: Drive new fastener approximately 1-1/2" from popped fastener and repair to match gypsum board finish.

I. Fill cracks with joint compound and sand smooth and flush.

J. Dust surfaces and leave ready for decoration. Joint and fastener treatment shall be indistinguishable in finished work.

End of Section

SECTION 09 3000

TILING

PART 1 - GENERAL

1.1 SUBMITTALS:

A. Shop drawings: Submit for tile pattern work indicated. Indicate control and expansion joint locations. Include tile layout, setting bed thicknesses, joint widths, control and expansion joint sizes and sections.

B. Product data: Submit manufacturer's printed product description and installation instructions for each type of tile and for use of manufactured mortars, grouts, adhesives, sealants, latex/polymer additives, crack isolation membrane and accessory products. Include mortar and grout proportioning and mixing instructions for latex/polymer additives.

C. Samples; submit the following:
1. 1'-0" by 1'-0" panel of each type and color tile selected, grouted as specified.
2. Samples of each trim shape required.
3. 1'-0" length of threshold.
4. Samples of each accessory required.
5. Submit samples of standard color sealant materials for Architect's approval.

D. Master grade certificates: Indicate that materials conform to ANSI A137.1 and ANSI A137.2. Certificates shall indicate grade, kind of tile, identification for tile packages and name and location of project. Tile manufacturer shall issue certificates at time of shipping.

E. Submit written certification that crack isolation membrane is approved for use with specified mortars.

1.2 QUALITY ASSURANCE:

A. Applicable standards:
1. Standards of the following, as referenced herein:
a. American National Standards Institute (ANSI).
b. ASTM International (ASTM).
c. Marble Institute of America, Version VII (MIA).
2. Tile Council of North America (TCNA), "Handbook for Ceramic, Glass, and Stone Tile Installation," 2014 Edition.

B. For each type of setting material and grouting material specified, only one brand shall be used throughout project.

C. Allowable tolerances: Plumb, level and true to line, meeting ANSI A108.02 as follows:
1. For tile with all dimensions less than 15": Maximum 1/16" in 1'-0" and maximum 1/4" in 10'-0".
2. For tile with any dimension greater than 15": Maximum 1/16" in 2'-0" and maximum 1/8" in 10'-0".

1.3 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials in original containers with labels legible and intact, identifying brand name and contents.
   1. Tile cartons shall be grade-sealed by manufacturer in accord with ANSI A137.1 and ANSI A137.2, with grade seals unbroken.
   2. Manufactured mortars, adhesives and grouts shall bear hallmarks certifying compliance with specified standards.

1.4 JOB CONDITIONS:

A. Environmental requirements: Comply with minimum temperature recommendations of manufacturers.

1.5 MAINTENANCE:

A. Extra materials:
   1. Provide one carton of each type, size and color of tile specified and 5% of each type, size and color of accessory, for Owner's maintenance.
   2. Store tile and accessory units where indicated by Owner.

PART 2 - PRODUCTS

2.1 TILE, GENERAL:

A. Factory blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

B. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

C. Factory-applied temporary protective coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating with continuous film of release agent as recommended by mortar and grout manufacturer or a hot-applied petroleum paraffin wax. Do not coat backs or sides of tile surfaces.

2.2 TILE:

A. The basis of design for each type of tile is scheduled on drawings. Tile of similar characteristics, as manufactured by other acceptable manufacturers, may be submitted for Architect's acceptance. Acceptance is subject to compliance with specified requirements, as evidenced by specified submittals.

B. Acceptable manufacturers; porcelain tile:
   1. American Marazzi Tile, Inc.
   2. American Olean/Dal-Tile Co.
   3. Buchtal Corp., U.S.A.
   4. Crossville Ceramics.
   5. Dal-Tile Corp.
   6. Florim USA.
   7. Florgres.
   8. GranitiFiandre, Trans Ceramic Ltd.
   9. Interceramic, USA.
   10. R.A.K. Ceramics.
   11. Roca Tile Group, Unites States Ceramic Tile Co.

C. Porcelain tile:

1. Meeting ANSI A137.1, Section 4.1 Impervious Class, and Section 6.1 Table 10, Standard Grade.
2. Color: As selected by Architect from manufacturer's full range.
3. Nominal face size: As scheduled on drawings.
4. Thickness: Minimum 3/8".
5. Finish: As scheduled on drawings.
6. Dynamic coefficient of friction (DCOF) for floor tile:
   a. Tested in accord with the DCOF AccuTest, and meeting ANSI A137.1 and recommendations of ADA Accessibility Guidelines.
   b. DCOF minimum: 0.42.
7. Trim shapes: Matching tile in color and size. Include coved base, coved bullnose base, bullnose caps, beads and corner units, as required.

2.3 SETTING MATERIALS AND ACCESSORIES:

A. Premium latex-modified thinset mortar for floor tile with all dimensions less than 15":
   1. Acceptable products:
      a. Bonsal American, ProSpec Superior Permaset 400.
      b. Bostik, Tile-Mate Premium.
      c. Custom Building Products, Flexbond Premium Flexible Bonding Mortar.
      d. Mapei Corp., Kerabond/Keralastic System.
   2. Characteristics: Pre-sanded, latex/polymer-modified or polymer-modified Portland cement and additives meeting ANSI A118.4.

B. Medium bed latex Portland cement mortar for floor tile with any dimension 15" or larger:
   1. Acceptable products:
      a. Bonsal American, ProSpec Medium Bed Permaflex 550.
      b. Bostik, Big Tile & Stone Mortar.
      c. Custom Building Products, MegaLite Crack Prevention Mortar.
      d. Mapei Corp., Ultralite Mortar.
   2. Characteristics: Pre-sanded, latex/polymer-modified Portland cement and additives meeting ANSI A118.15, minimum 400 psi shear strength.

C. Premium latex-modified thinset mortar for wall base tile:
   1. Acceptable products:
      a. Bonsal American, ProSpec Superior Permaset 400.
      b. Bostik, Tile-Mate Premium.
      c. Custom Building Products, MegaLite Crack Prevention Mortar.
      d. Mapei Corp., Kerabond/Keralastic System.
   2. Characteristics: Pre-sanded, latex/polymer-modified Portland cement and additives meeting ANSI A118.15, minimum 400 psi shear strength, non-sag.

D. Crack isolation membrane:
   1. Acceptable products:
      a. The Noble Co., Noble Seal CIS.
      b. Compotite Corporation, Composeal Gold.
      c. Custom Building Products, Crack Buster Pro.
      d. NAC Products, Inc., ECB Membrane.
   2. Characteristics:
      a. Material: Minimum 30 mil thickness fiber/fabric-reinforced elastomeric membrane meeting ANSI A118.12 High Performance.

b. Primer, adhesive and accessories: As recommended by membrane manufacturer's product data with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 GROUTING MATERIALS:

A. Epoxy grout for all floor tile and for wall base tile:
1. Acceptable products:
a. Bonsal American, ProSpec B-7000 Epoxy Mortar & Grout.
b. Bostik Findley, Color-Poxy.
c. Custom Building Products, CEG-Lite 100% Solids Commercial Epoxy Grout.
d. Mapei Corp., Kerapoxy.
2. Characteristics: 100% epoxy, two-part or three-part composition meeting ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D; standard colors selected by Architect.
3. Grout release agent: Provide grout manufacturer’s recommended grout release agent, for application prior to grouting tile to receive epoxy grout.

2.5 ADDITIVES:

A. Latex/polymer additives: Integral polymer additives or undiluted additives for field mixing. Additives shall be manufactured by or approved in writing by mortar and grout manufacturers.

B. Proportioning and mixing: Comply with mortar and grout manufacturers' product data for additive proportions and mixing instructions.

2.6 CONTROL AND EXPANSION JOINT MATERIALS:

A. Acceptable products:
1. Pecora Corp., Dynatrol II.
2. BASF Building Systems, MasterSeal NP-2.
3. Custom Building Products, 100% Silicone Caulk.
4. Tremco, Inc., Dymeric.

B. Characteristics:
1. Type; Contractor’s option:
a. Urethane: Two-part, polyurethane-based sealant with separate pre-packaged color agent; VOC Content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
b. Silicone: One-part silicone caulk meeting ASTM C920-14, Shore A Hardness of 35+, Type S, Grade NS, Class 25, Use T, I, M & G and ASTM C794-10 properties.
2. Colors: Colors as selected by Architect from manufacturer’s full range.

C. Primer: Types recommended by sealant manufacturer:
1. Sealant primers for nonporous substrates: 250 g/L.
2. Sealant primers for porous substrates: 775 g/L.

D. Backup material: Flexible, non-compressive foam type as recommended by sealant manufacturer.

2.7 ACCESSORY MATERIALS:

A. Marble thresholds: Meeting MIA Group A, honed finish, in sizes and shapes indicated; types and colors as selected by Architect.

B. Cleaning materials and methods for face of epoxy-grouted tile: Provide grout cleaning materials and methods in accord with manufacturer's product data.

C. Grout sealer: Manufacturer's standard grout sealer which does not change color or appearance of grout. Subject to compliance with requirements of this specification, provide named products and systems or comparable products and systems by one of following manufacturers:
1. Acceptable products:
a. Bostik Findley; "CeramaSeal Magic Seal™ Grout Sealer".
b. Custom Building Products; "TileLab SurfaceGard Penetrating Sealer".
c. Southern Grouts & Mortars, Inc; "Grout Sealer-Premium Stain Blocker".
d. Summitville Tiles, Inc.; "SL-99 SummitSeal II".

D. Leveling compound; acceptable products:
1. Custom Building Products, LevelQuik RS.
2. Euclid Chemical Co., Super Flo-Top.
3. Mapei, Ultraplan 1 Plus.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION:

A. Subfloor curing:
1. Concrete subfloors shall be moisture-cured or cured using a curing compound in accord with the requirements of the Concrete Finishing section.
2. If a curing compound has been used, Contractor shall verify that compound is compatible with flooring manufacturer's installation materials.
3. If the curing compound is not compatible, or if compatibility is unknown, Contractor shall remove curing compound by shot-blasting or other methods approved by floor finish manufacturer.

B. Concrete moisture vapor emission, humidity levels and pH testing: Perform one or more of the following tests, as required by flooring manufacturer's product data, using the following methods:
1. Moisture vapor emissions: Perform tests on subfloors in accord with ASTM F1869-11 calcium chloride test and flooring manufacturer's product data, to determine if surfaces are acceptable to receive specified flooring products.
2. Humidity level: Perform on subfloors in accord with ASTM F2170-11 *in situ* probe and flooring manufacturer's product data, to determine if surfaces are acceptable to receive specified flooring products.
3. Concrete pH level: Perform on subfloors to verify that surfaces are acceptable to receive specified flooring products.
4. Correction of conditions: Prior to installation, correct conditions that do not meet flooring manufacture's requirements, or that may be detrimental to flooring installation.

C. Leveling compound:
1. Acceptable substrates: Concrete shall be fully cured, scarified, and shall accept water penetration. Test by sprinkling water on various areas of the substrate.
a. If water penetrates, then a good bond can be achieved.
b. If water beads, surface contaminants are present, and loss of adhesion may occur. Contaminants should be mechanically removed before installation.
c. Concrete be free of efflorescence and not subject to hydrostatic pressure. Concrete slabs should have a broomed or brushed finish to enhance the bond. Smooth concrete slabs must be mechanically abraded to ensure a good bond.
2. Installation:
a. Priming: Apply primer in accord with manufacturer's installation instructions.
b. Leveling compound: Pour or pump, and then spread with a long-handled gauged spreader. Leveling compound will seek its own level during the first 10 minutes.
1) For feather edging and touch up, use a smoothing tool.
2) Leveling compound can be applied to 1" (2.5 cm) thick in one application; if a second layer is required, install immediately after the first layer has set to a walkable hardness. If the first layer has dried over 12 hours, re-prime before the second application.

D. Crack isolation membrane:
1. Install crack isolation membrane in accord with TCNA F125-14; install in accord with manufacturer's product data.
2. Full-floor application: Install under all thinset and medium-bed-set floor tile, excluding where membrane waterproofing is required.
3. Partial application: Install over substrate cracks and joints.
4. Install tile in accord with TCNA F125-14 for crack isolation areas.

E. Conditions of surfaces to receive tile:
1. Surfaces shall be firm, dry, clean and free of oily or waxy films.
2. Grounds, anchors, plugs, hangers, bucks, electrical and mechanical work in or behind tile shall be installed prior to proceeding with tile work.

3.2 GENERAL TILE INSTALLATION:

A. Install tile in accord with ANSI A108.1 through A108.17 and as specified herein.

B. Layout:
1. Center tile within areas to avoid tiles of unequal widths at opposite walls and tiles of less than ½ tile width.
2. Align tile joints straight and parallel to walls.
3. Align joints in floor and base or wall tile.
4. Locate accessories, control joints and expansion joints before installing tile.

C. Cutting and fitting:
1. Cut and drill tiles without damaging exposed tile face. Rub cut edges smooth with Carborundum stone.
2. Grind and fit tile at intersections, against trim and at built-in fixtures and accessories.
3. Fit tile around outlets, pipes, fixtures and fittings so that tile edges are concealed under applied escutcheons, collars or plates.

4. Miter coved and bullnose tile in corners or use special trim shapes to maintain uniform joint widths.

D. Joints:
1. Joint widths for tile shall be as selected by Architect.
2. In internal vertical corners of wall tile and where tile abuts dissimilar materials, form joints using control joint filled with sealant in lieu of grout.

E. Control and expansion joints:
1. Ascertain that control and expansion joints are located in accord with approved shop drawings, TCNA EJ171-14, and as approved in advance by Architect.
2. Provide control joints, perimeter control joints and expansion joints through tile and setting bed.
   a. Field of floor control joints shall be located as follows:
      1) Spacing indicated, but not less than the following:
         a) Interior areas: 20'-0" to 25'-0" o. c. in each direction.
         b) Interior areas subjected to sunlight or moisture: 8'-0" to 12'-0" o. c. in each direction.
      2) Over cold joints and saw-cut control joints.
   b. Provide control joints at all perimeters.
   c. Locations of joints shall be as approved in advance by Architect. Width of joints shall match width of grout joints, except control joint shall be not less than 1/8" wide.
3. Prime joints in accord with sealant manufacturer's product data. Following tile work completion, seal joints in accord with TCNA EJ171-14, using specified sealant.
4. Relocation of existing subfloor joints:
   a. Where existing subfloor joint is required to be relocated, span joint by installing crack isolation membrane over existing joint.
   b. Install crack isolation membrane in accord with TCNA F125-14 Partial, as herein specified.
   c. Move joint location to the nearest tile or stone grout joint.

F. Thresholds, transition strips and edge strips:
1. Marble thresholds: Install in accord with TCNA TR611-14. Seal joint between threshold and tile using sealant in lieu of grout.
2. Transition strips and edge strips: Install at door openings not having thresholds, at intersections with other flooring materials, and at other locations as shown on the drawings.

G. Tolerances:
1. Allowable lippage: Comply with ANSI A108.02 as follows:
   a. Glazed wall tile: 1/32".
   b. Porcelain tiles, joint width less than 1/4": 1/32".
2. Allowable site installation tolerances: Plumb, level and true to line, meeting ANSI A108.02 as follows:
   a. For tile with all dimensions less than 15": Maximum 1/16" in 1'-0" and maximum 1/4" in 10'-0".
   b. For tile with any dimension greater than 15": Maximum 1/16" in 2'-0" and maximum 1/8" in 10'-0".

H. Grout release agent: Prior to grouting tile to receive epoxy grout, apply specified grout release agent to face of tile only. Do not allow agent to migrate into joints.

3.3 TILE INSTALLATION:

A. Floor tile with any dimension 15" or larger, medium bed set, interior:
1. Setting method: Medium-bed latex Portland cement mortar.
2. Standard installation method: Generally in accord with TCNA F113-14 for standard grout, and TCNA F115-14 for epoxy grout.
3. Grout type: Epoxy grout. Apply grout release agent prior to grouting tile to receive epoxy grout.

B. Floor tile with all dimensions less than 15", thinset, interior:
1. Setting method: Premium latex-modified thinset mortar.
2. Standard installation method: TCNA F115-14.
3. Grout type: Epoxy grout. Apply grout release agent prior to grouting tile to receive epoxy grout.

C. Wall tile and base, thinset over masonry, interior:
1. Setting method: Premium latex-modified thinset mortar bond coat.
2. Standard installation method: TCNA W202-14.
3. Grout type: Epoxy grout. Apply grout release agent prior to grouting tile to receive epoxy grout.

3.4 CLEANING AND PROTECTION:

A. Clean tile as work progresses, preventing accumulation of setting and grouting materials or debris on tile faces.

B. Immediately remove stains, grout release agent, excess mortar, grout and sealant from faces of tile; comply with manufacturer's product data.

C. Thresholds and glazed tile: Clean thresholds and glazed tile using a solution of detergent and water only. Do not use acids or harsh cleaning agents to clean thresholds or glazed tile.

D. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions.
1. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned.
2. Protect metal surfaces and plumbing fixtures from effects of cleaning.
3. Flush surfaces with clean water before and after cleaning.

E. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

F. Protection: Protect installed tile work until Date of Substantial Completion by covering with kraft paper.

End of Section

SECTION 09 5100

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work specified elsewhere:
1. Gypsum board.

1.2 SUBMITTALS:

A. Shop drawings; include the following:
1. Layout, including locations of lighting fixtures and grilles.
2. Insert and hanger spacing and fastening details.
3. Splicing method for main and cross runners.
4. Change in level details.
5. Support requirements for lighting fixtures, grilles and similar items.

B. Product data: Include product descriptions and installation instructions for each material. Indicate load carrying capacity of suspension system hanger spacings and manufacturer's recommended methods for fixture support.

C. Samples; submit the following:
1. 1'-0" by 1'-0" samples of each type and color acoustical material.
2. Samples of each type and color suspension member and accessory.

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

1.3 QUALITY ASSURANCE:

A. Applicable standards; standards as referenced herein:
1. American Iron and Steel Institute (AISI).
2. ASTM International (ASTM).
3. Ceiling & Interior Systems Contractors Association (CISCA).
4. Underwriters Laboratories, Inc. (UL).

B. Seismic performance: Comply with building code requirements.

C. Source limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.

D. Mock-up:
1. Install complete ceiling of each type specified, in space designated by Architect. Notify Architect when spaces are ready for observation.
2. Following Architect's acceptance, retain mock-up as a standard of quality for ceiling installation. Accepted mock-up may remain as part of finished work.

1.4 PROJECT/SITE CONDITIONS:

A. Sequencing and scheduling: Schedule acoustical material installation to minimize need for removal and replacement of acoustical units to accommodate work of other trades.

1.5 MAINTENANCE MATERIALS:

A. Furnish extra materials equal to one percent of each type of acoustical material supplied.

B. Furnish suspension system components in amount sufficient to install extra ceiling units.

PART 2 - PRODUCTS

2.1 METAL SUSPENSION SYSTEMS, GENERAL:

A. Metal suspension system standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C635-13a.
1. High humidity finish: Comply with ASTM C635-13a requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

B. Carrying channels: 16 ga. cold-rolled steel, 1-1/2" deep.

C. Attachment devices: Size for five times the design load indicated in ASTM C635-13a, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
1. Hanger clips: Prefabricated metal clamps for fastening to building structure.

D. Wire hangers, braces, and ties: Provide wires complying with the following requirements:
1. Zinc-coated, carbon steel wire: ASTM A641-09a(2014), Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C635-13a, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.

E. Seismic components: Provide as required by building code:
1. Seismic stabilizer bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
2. Seismic struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
3. Seismic clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in place.

F. Hold-down clips: Where indicated, provide suspension system manufacturer's standard hold-down clips compatible with ceiling panels specified; spaced 24 inches o.c. on all cross tees.

G. Impact clips: Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

2.2 STEEL SUSPENSION SYSTEMS:

A. Acceptable manufacturers; subject to compliance with specified requirements:
1. Armstrong World Industries, Inc.
2. CertainTeed Corp.
3. Chicago Metallic Corp.
4. USG Interiors, Inc.

B. Exposed steel grid system; 15/16" flange face.
   1. Structural classification: Meeting ASTM C635-13a:
      a. Heavy Duty for seismic categories D, E and F,
      b. Intermediate Duty for seismic categories A, B and C.
   2. Module: 2'-0" by 2'-0".
   3. Main and cross tees:
      a. Tee material: Hot dip galvanized, cold-rolled steel.
      b. Cap material: Hot dip galvanized, cold-rolled steel.
      c. Design: Double web.
      d. Tee size: 15/16" flange face width; 1-1/2" nominal height main tees.
         1) 2'-0" or 4'-0" long cross tees.
         2) Material thicknesses shall be as required to meet specified structural classifications.

   4. Edge molding:
      a. For square edge panels: Minimum 0.020" thickness galvanized steel, channel or angle shaped, hemmed edges.
      b. Flange widths:
         1) Non seismic category areas: Minimum 3/4".
         2) Seismic category C: Minimum 7/8" (or use vertical perimeter wires not more than 8" from wall).
         3) Seismic categories E, D and F: Minimum 2".
   5. Finish on exposed components: Chemically treated for paint adhesion with factory-applied, low-gloss white paint.

2.3 ACOUSTICAL CEILING PANELS:

A. Acceptable manufacturers; subject to compliance with specified requirements:
   1. Armstrong World Industries, Inc.
   2. CertainTeed Corp.
   3. USG Interiors, Inc.

B. Basis of design: As scheduled on drawings. Acoustical ceilings of similar design and construction, as manufactured by other acceptable manufacturers, may be submitted for Architect's consideration. Acceptance is subject to compliance with specified design criteria, as evidenced by submittal of specified product data, and Architect’s approval.

C. Characteristics:
   1. Size: 2'-0" by 2'-0".
   2. Thickness: 5/8".
   3. Edges: Square.
   4. Finish: Factory-applied, washable paint.

2.4 ACCESSORIES:

A. Acoustical sealant:
   1. Acoustical sealant for exposed and concealed joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834-14 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90-09.
   2. Acoustical sealant for concealed joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

3. Sealant shall have a VOC content of 250 g/L or less.

B. Sound attenuation blankets: 1-1/2" thickness, minimum 2-1/2 lb. density, paperless, semi-rigid, mineral fiber blanket.

C. T-Grid support clip:
1. Acceptable products:
a. Armstrong World Industries, Inc., Beam End Retainer Clip Item 7395.
b. Chicago Metallic corp., Perimeter clip 1499.
c. Erico Products, Inc., Caddy TGE T-Grid support clip.
d. USG Industries, Inc., Mac 2.
2. Characteristics: Mechanical clip for attaching acoustical “T” to edge molding without exposed fasteners in grid system.

PART 3 - EXECUTION

3.1 SUSPENSION SYSTEM INSTALLATION:

A. Install suspension system in accord with manufacturer’s product data, ASTM C636-13, ASTM E580-14 and CISCA recommendations, except for more stringent requirements specified herein.

B. Layout:
1. Center grid system within areas to avoid panels of unequal widths at opposite walls and panels of less than 1/2 width.
2. Align grid members straight and perpendicular to walls.
3. Locate accessories, control joints and expansion joints before installing grid system.

C. Seismic requirements:
1. Comply with building code for seismic restraint requirements.
2. Install suspension systems in accord with ASTM E580-14 and ASCE 7-10.
3. Lateral bracing: In addition to complying with ASTM C636-13, ASTM E580-14 and ASCE 7-10, install suspension systems in accord with CISCA 0-2 for Seismic Design Category C, CISCA 3-4 for Seismic Design Categories D, E, and F, and applicable building code requirements.
4. Perimeter requirements:
a. Category C: Where perimeter angle is less than 7/8", provide perimeter vertical hangar wires not less than 8" from wall.
b. Categories D, E and F: Provide perimeter vertical hangar wires not less than 8" from wall.
c. Grid end/wall details:
1) Category C: Minimum 3/8" clearance on all 4 walls.
2) Categories D, E and F: Two adjacent walls shall be tight and two adjacent walls shall have a minimum 3/4" clearance.

D. Hangers:
1. Space hangers for carrying channels or main tees at 4'-0" o. c. maximum. Secure to building structure.
2. Install additional hangers at ends of each suspension member, within 6" of end of member or wall.
3. Install additional hangers within 6" of each corner of lighting fixtures, grilles and similar items.
4. Splay wires no more than 5" in 2'-6" vertical drop.

5. Where spacing of hangers for main tees exceeds maximum specified spacing due to interference by adjacent construction, indirect-hang tees using carrying channels to maintain maximum hanger spacing.
6. Wrap wire minimum of three times horizontally, turning ends upwards.

E. Carrying channels: Saddle-tie carrying channels to main structure for indirect-hung suspension system.

F. Direct-hung, exposed grid system, 2'-0" by 2'-0" module:
1. Space main tees at 4'-0" o. c., maximum, perpendicular to structure.
2. Locate cross tees at 2'-0" o. c., perpendicular to main tees.
3. Space cross tees at 2'-0" o. c., perpendicular to previously installed cross tees, to form 2'-0" by 2'-0" grid module. Connect to cross tees through slots in main tees.

G. Level and square suspension system components within specified tolerances prior to beginning ceiling material installation.

H. Install cross tees adjacent to lighting fixtures and grilles on each side not supported by main tees. Support no fixtures on main or cross tees when fixture weight results in dead load exceeding deflection capacity of suspension system.

I. Where cut tees intersect other tees or edge moldings without mechanical attachment, attach components using T-Grid support clip. At contractor's option tees may be attached directly to partition with tie wire.

J. Wall moldings:
1. Install wall molding at intersection of suspended ceiling and vertical surfaces.
2. Miter corners where wall moldings intersect or install corner caps.
3. Attach to vertical surfaces with mechanical fasteners.
4. In each orthogonal horizontal direction, attach one end of ceiling grid to closure angle. The other end in each horizontal direction shall have 3/4" clearance from wall and shall rest upon and be free to slide on closure angle.

K. Where grid system exists in an unrestrained condition, brace back to building structure using hanger wire, main tee or carrying channel braces spaced at 4'-0" o. c., maximum.

3.2 ACOUSTICAL UNIT INSTALLATION:

A. Install acoustical units in level plane, in straight line courses, within specified tolerances.

B. Place acoustical materials to bear all around on suspension members.

C. Pattern shall be symmetrical about centerline of area, unless otherwise indicated. Lay out units having directional pattern in same direction.

D. Where cutting of acoustical units is required, cut so that no cut or damaged edges are visible in finished work.

E. Hold-down clips:
1. Install acoustical units surrounding recessed troffer lights with hold-down clips to prevent movement or displacement of units.
2. Install hold-down clips at exterior ceiling panels panels.

F. Lay sound attenuation blankets over ceilings in designated spaces.

G. Allowable tolerances:
1. Deflection: Suspension system components, hangers and fastening devices supporting lighting fixtures, ceiling grilles and acoustical units shall have maximum deflection of 1/360 of the span when tested in accord with ASTM C635-13a.
2. Bow, camber and twist: Not exceeding tolerances established by ASTM C635-13a.
3. Variation from level in finished ceiling: ±1/8" in 12'-0".

3.3 CLEANING:

A. Clean soiled or discolored unit surfaces after installation.

B. Touch up scratches, abrasions, voids and other defects in painted metal surfaces.

C. Remove and replace damaged and stained acoustical units with new units.

End of Section

SECTION 09 6500

RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUBMITTALS:

A. Product data: Indicate product characteristics and installation requirements, including manufacturer's recommended adhesives and maintenance instructions.

B. Samples: Submit full size samples for each type color and pattern of flooring and accessory required.

1.2 QUALITY ASSURANCE:

A. Applicable standards, as referenced herein: ASTM International (ASTM).

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups for floor tile including resilient base and accessories.
2. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations indicated in locations directed by Architect.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.3 PROJECT/SITE CONDITIONS:

A. Environmental requirements:
1. Maintain temperature in space to receive resilient materials at not less than 70°F. for not less than 24 hours before, during and for 48 hours after installation.
2. Maintain minimum temperature of 55°F. after flooring is installed, except as specified above, for duration of project.

B. Protection: Protect finished flooring, base and accessories from staining, marring or other physical damage by work of other trades. Cover or mask surfaces as required.

1.4 MAINTENANCE MATERIAL:

A. Furnish additional floor tile of each color and pattern of tile as maintenance material. Furnish at the rate of one carton for each 1000 sq. ft. of floor surface or fraction thereof.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS:

A. Fire-test-response characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E648-14c or NFPA 253 by a qualified testing agency.

1. Critical radiant flux classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL COMPOSITION TILE:

A. Acceptable manufacturers:
1. Armstrong World Industries, Inc.
2. Mannington Commercial.
3. Tarkett, Inc.

B. Type: Meeting ASTM F1066-04(2014), Class 2 for through pattern tile.

C. Size: 1'-0" by 1'-0" face size by 1/8" thickness.

D. Colors: Match colors scheduled on drawings.

2.3 RUBBER BASE:

A. Acceptable manufacturers:
1. Burke Flooring, a Div. of Burke Industries.
2. Roppe Corp.
3. Johnsonite, Inc.

B. Characteristics:
1. Type: Minimum 48% rubber, 100% vulcanized; meeting ASTM F1861-08(2012), Type TP.
2. Length: Minimum 120'-0" rolls.
3. Thickness: 1/8".
4. Height: 4".
5. Style: Coved.
6. Colors: Match colors scheduled on drawings.

C. Corners: Preformed inside and outside corners. Preformed corners shall match base in color, sheen and overall appearance.

2.4 ACCESSORIES:

A. Acceptable manufacturers:
1. Burke Flooring Products, a Div. of Burke Industries.
2. Marley Flexco (USA), Inc.
3. Johnsonite, Inc.
4. R. C. Musson Rubber Co.
5. Roppe Corp.

B. Reducers:
1. Material: Vinyl.
2. Thickness: Same as abutting floor materials.
3. Width(s): 1".
4. Edges: Tapered.
5. Colors: As selected by Architect from manufacturer's standard colors.

2.5 INSTALLATION MATERIALS:

A. Leveling compound; acceptable products:
1. Custom Building Products, LevelQuik RS.
2. Euclid Chemical Co., Super Flo-Top.
3. Mapei, Ultraplan 1 Plus.

B. Adhesives: Water-resistant types and brands of solvent-free adhesive recommended by flooring material manufacturer's product data for installation conditions indicated.
   1. VOC Content: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
      a. VCT adhesives: Not more than 50 g/L.
      b. Cove Base Adhesives: Not more than 50 g/L.

C. Wax and buffing compound: Types recommended by floor covering manufacturer for the particular type of flooring material.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Prepare surfaces to receive resilient material in accord with flooring manufacturer’s instructions.

B. Grind high areas and fill depressions with leveling compound where required to produce smooth installation and for proper alignment of resilient flooring with adjacent flooring materials.

C. Perform bond and moisture tests on subfloors in accord with ASTM F2170-11 and resilient flooring manufacturer’s product data, to determine if surfaces are acceptable to receive specified resilient flooring products. Correct conditions detrimental to resilient flooring installation prior to starting installation.

D. Remove dirt, oil, grease or other foreign matter from surfaces to receive floor covering or accessories.

3.2 APPLICATION OF ADHESIVES:

A. Mix and apply adhesives in accord with resilient material manufacturer’s product data. Apply with notched trowel or other tools as recommended by adhesive manufacturer.

B. Provide safety precautions during mixing and applications as recommended by adhesive manufacturer.

C. Apply adhesive to only that area which can be covered by resilient material within the recommended working time of the adhesive.
   1. Remove adhesive which dries or films over.
   2. Do not soil walls, bases or adjacent areas with adhesives.
   3. Remove spilled or misplaced materials.

3.3 TILE INSTALLATION:

A. Lay tile in accord with resilient tile manufacturer’s product data.

B. Lay tile beginning at center of room or space, working toward perimeter.
   1. Adjust starting point as necessary to provide border tile widths equal to or greater than a half width tile.
   2. Joints between tile shall be fitted without gap; butted together.
   3. Cut border tile to fit within 1/32" of abutting surfaces.

C. Fit flooring material into breaks and recesses, against bases, around pipes and penetrations, under saddles or thresholds and around permanent cabinets and equipment.

D. Lay tile with grain or pattern running in same direction as adjacent tiles.

3.4 INSTALLATION OF BASE:

A. Workmanship:
1. Unroll base material and allow to relax for 24 hours, minimum, prior to installation. Cut into lengths for minimum number of joints. Double-cut adjoining lengths.
2. Install with tight butt joints with no joint widths greater than 1/64".

B. Top-set base:
1. Apply adhesive and adhere to vertical surfaces.
2. Press down so that bottom edge follows floor profile.
3. Form internal corners using premolded corners.
4. Form external corners using premolded corners.
5. Scribe base to abutting materials.

3.5 ACCESSORY INSTALLATION:

A. Cut materials to lengths and sizes indicated.

B. Resilient reducers:
1. Apply adhesives and bond to substrate.
2. Center reducers in door openings.
3. Fit edge to door frame jambs without visible gaps or cracks.
4. Fit edges to abutting floor materials for flush fit.

3.6 CLEANING:

A. Upon completion of installation, clean surfaces using a neutral cleaner acceptable to material manufacturer.

B. Just prior to Date of Substantial Completion, buff no-wax floors using buffing compound for no-wax finish or apply two coats of non-slip wax to clean waxable floor surfaces and buff.

End of Section

SECTION 09 9000

PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY:

A. Work of this section includes:
1. Touching up of shop-applied prime coats.
2. Preparation of surfaces to receive finishes.
3. Painting, staining or otherwise finishing of surfaces, except as otherwise indicated.

B. Related work specified elsewhere:
1. Shop-applied primer coats.
2. Joint sealants.
3. Wall coverings.
4. Special finishes.
5. Piping identification.
6. Prefinished items.

1.2 DEFINITIONS:

A. Properly painted surface: The painting contractor shall produce properly painted surfaces as herein defined, and shall obtain Architect’s approval of all surfaces.
1. A "properly painted surface" is defined as uniform in appearance, color, texture, hiding and sheen.
2. Surfaces shall be free of foreign material, lumps, skins, runs, sags, holidays, misses, or insufficient coverage.
3. Surfaces shall be free of drips, spatters, spills or overspray caused by the painting contractor's workforce.
4. To determine whether a surface has been "properly painted", the surface shall be examined without magnification at a distance of thirty-nine (39) inches or one (1) meter, or more, under finished lighting conditions and from a normal viewing position.

B. Standard coating terms: As defined in ASTM D16-14.

C. Commercial: Painter grade products.

D. DFT: Dry film thickness of the coating.

E. Premium: Best quality product (top of the line):

F. VOC: Volatile Organic Compounds found in primers, paints, sealers and stains. VOC levels are designated in grams per liter (g/L).

1.3 PERFORMANCE REQUIREMENTS:

A. DFT for each primer, paint, sealer and stain shall be as recommended by product manufacturer’s product data.

1.4 SUBMITTALS:

A. Product data:
1. Submit complete list of products proposed for use at least 30 days prior to commencement of painting work.
2. Indicate manufacturer, brand name, quality, type, and sheen for each type of paint and for each surface to be finished. Indicate VOC rating and compliance with applicable regulations.
3. Indicate manufacturer's instructions regarding mixing, surface preparation and application. Include application rates, film thickness and required primers.
4. Intent of Contractor to use products specified does not relieve him from responsibility of submitting product list.

B. Card stock brush-outs: Prepare two sets of color coat brush-outs for each paint and stain color and sheen scheduled, applying actual finish color coat to standard sample card stock, minimum 80 sq. in. size.

C. Substrate brush-outs:
1. In addition to color coat brush-outs, submit one actual brush-out sample application for each paint type, color and sheen as applicable to the following substrates.
2. Apply complete finish system in the number of coats specified, to the actual substrate material or simulated material indicated; allow 1" offset of each successive coat along one edge to illustrate successive applications.
a. Concrete unit masonry: One face of a concrete block of type and texture used on the project.
b. Gypsum board and concrete: Apply over gypsum board, 1'-0" by 1'-0" size, edges taped and sanded.
c. Metals: Apply over hardboard, 1'-0" by 1'-0" size.
d. Painted wood: Wood stock typical of type, color and cut used on the project, minimum 6" wide by 1'-0" long.

1.5 QUALITY ASSURANCE:

A. Applicable standards:
1. American Coatings Association (ACA), Gloss Standard.
2. ASTM International (ASTM), as referenced herein.
3. American National Standards Institute (ANSI) Performance Standards.
4. Environmental Protection Agency (EPA), volatile organic compounds (VOC) standards as required by local codes and regulations.
5. Master Paint Institute (MPI) established paint categories and standards.
6. Occupational Safety & Health Act (OSHA) Safety Standards.
7. Ozone Transmission Commission (OTC) established levels of Volatile Organic Compounds.
8. Paint Decorating Contractors of America (PDCA) Application Standard, P1 Standard and P5 Standard.

1.6 DELIVERY, STORAGE AND HANDLING:

A. Delivery: Deliver materials to project site ready-mixed in original containers with labels intact; labels bearing manufacturer's name, paint type, color and recommended installation and reducing procedures.

B. Storage and handling:
1. Store materials in location acceptable to Architect.
2. Coating materials and thinners stored on site shall be kept in a clean, secure and climate controlled area.
3. Labels shall remain on containers used to hold primers, paints or stains while on site. Containers without labels shall be disposed of.
4. Product name, number, health and safety information, and precautions shall be legible at all times during storage and use.
5. Close containers at end of day's work. Leave no materials open.

C. Waste management and disposal:
1. Disposal containers for recycled materials must be established on site.
2. Dispose of rags containing solvent, daily.
3. Dispose of hazardous coatings in accord with state, county and local regulations for hazardous waste disposal.

1.7 PROJECT/SITE CONDITIONS:

A. Environmental requirements:
1. Comply with manufacturer's product data as to environmental conditions under which materials may be applied.
2. Apply no materials in spaces where dust is being generated.
3. Comply with applicable VOC regulations.

B. Protection: Cover finished work of other trades and surfaces not being painted concurrently and prefinished items.

C. Safety precautions:
1. Provide temporary fire protection equipment in materials storage area.
2. Prohibit smoking in storage area.

1.8 MAINTENANCE:

A. Extra materials:
1. Provide one gallon of each type and color of paint and stain in full unused cans.
2. Cans shall be marked with color name, number and type of paint and stain.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable manufacturers: Except as otherwise noted, products specified as a standard of quality are manufactured by PPG Paints. Products of the following manufacturers similar in type and quality are acceptable for use, subject to approval of product list:
1. PPG Paints.
2. Benjamin Moore Co.
3. Sherwin-Williams Co.

B. Where products other than those of the manufacturer listed as the standard of quality are specified in Painting Schedule, such products have been selected to achieve specific results and substitutions will be allowed only in accord with Product Substitution Procedures section.

2.2 PAINTING MATERIALS:

A. Miscellaneous materials:
1. Paint thinners and tints shall be products of same manufacturer as paints or approved by him for use with his products.
2. Shellac, turpentine, patching compounds and similar materials required for execution of work shall be pure, best quality products.

B. Paint and stain colors shall be as indicated on Color Schedule with final approval based on brush-out submittal.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Surfaces to receive finishes shall be dry and free of debris, oils, dust or other deleterious materials.

B. Existing surfaces:
1. For previously painted surfaces, remove dirt, debris and chalk by washing with detergent and water. Sand glossy surfaces. Remove loose paint and blisters by scraping and sanding. Apply bond coat when required by paint manufacturer's product data.
2. Previously painted metal surfaces to remain shall be wire-brushed and cleaned of existing paint and rust.
3. Treat mildewed surfaces with a solution of one quart hypochlorite bleach to a half cup of detergent to one gallon water. Rinse and allow to dry prior to painting.
4. Previously painted masonry:
a. Where existing paint is loose or blistered, remove by scraping or brushing.
b. Remove debris and chalking from surfaces by washing with detergent and water. Flush with clean water. Touch up with material specified for finish.

C. Where finish materials abut or are abutted by dissimilar materials, caulk joints in accord with Joint Sealants section.

D. Lumber, plywood and veneered wood surfaces:
1. Apply shellac, maximum two pounds cut to knots, pitch and resinous sapwood prior to application of first paint or stain coat.
2. For surfaces to receive opaque finish, fill nail holes, cracks, joints and defects with spackling compound. Apply after first coat of paint.
3. For surfaces to receive transparent finish, fill nail holes, cracks and defects with wood filler matching finish color.
4. Sand surfaces smooth except where rough sawn surfaces are indicated. Final step shall remove scuffs, handling marks and effects of moisture exposure. Dust to remove debris.
a. Sand plane surfaces using sanding block; touch sand moldings in manner preventing removal of sharp edges or obscuring profile.
b. Moldings cut with machine finish or minimum 16 knife cuts per inch shall not require further sanding except to correct irregularities.

c. Sand surfaces within normal visual range, including surfaces within 10'-0" of floor level, using not less than 80 grit abrasive exterior or 100 grit abrasive interior, except increase to 120 to 180 grit abrasive for transparent finished interior surfaces.
d. Install prefinished or presurfaced items following finishing or sanding of adjacent surfaces. Replace prefinished items damaged by finishing of adjacent work.

E. Gypsum board:
1. Fill narrow, shallow cracks and small holes with patching compound. Allow to dry and sand smooth without raising nap of gypsum board paper.
2. Gypsum board shall be finished as specified in Gypsum Board section prior to painting.

F. Concrete:
1. Fill cracks, holes and irregularities with cement grout.
2. Remove laitance, oil, grease, dirt and debris from surfaces. Allow concrete to cure prior to paint application.

G. Concrete unit masonry: Rub to remove loose mortar and debris. Fill irregularities with cement grout.

H. Galvanized metals:
1. Test for passivator or stabilizer using copper sulfate solution (20 grams of copper sulfate in one liter of water). If passivator or stabilizer is present, remove by brush blasting, sanding or chemical etching.
2. Wash with xylol to remove grease, oil and contaminants. Wipe dry with clean cloth.

I. Aluminum:
1. Sand or scrape to remove oxides.
2. Wash with xylol to remove grease, oil and contaminants. Wipe dry with clean cloth.

J. Ferrous metals:
1. Wire-brush or sandpaper to remove rust and mill scale.
2. Solvent-clean with xylol to remove grease, oil and contaminants. Wipe dry with clean cloth.

3.2 APPLICATION:

A. Apply paint only when moisture content of surfaces is within limits recommended in product data. Apply paint materials using clean brushes, rollers or spraying equipment.

B. Apply materials at rate not exceeding that recommended in product data for surface being painted, less ten percent for losses.

C. Comply with product data for drying time between coats.

D. Sand and dust between coats to remove defects visible from a distance of 5'-0".

E. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paint, skipped or missed areas. Do not apply additional coats until completed coat has been observed by Architect. Only these coats of paint will be considered in determining number of coats applied.

F. Make edges of paint adjoining other materials or colors clean and sharp without overlapping.

G. Primer coats may be omitted for surfaces specified to receive factory-applied primer, if primer is compatible with finish coats. If primer coats are not compatible, substitute a bond coat as recommended by paint manufacturer for specified primer coat.

H. Where two-coat finish is specified, prime coat shall be tinted to approximate finish color.

I. Where portion of finish on gypsum board partition is damaged or unacceptable, refinish entire surface of partition.

J. Seal tops and bottoms of interior doors with prime coat only; side edges same as faces.

K. Finish top, bottom and side edges of exterior doors same as faces.

L. Paint inside of ductwork flat black for entire area visible through ceiling openings. Paint underside of ductwork and other above-ceiling items flat black for entire area visible through ceiling openings.

M. Paint exposed piping and ductwork in painted spaces same as adjacent wall surfaces.

N. Paint exposed grilles and registers in public spaces.

O. Paint walls, exposed structure, handrails and exposed ductwork and piping in stairwells.

P. Remove and protect hardware, accessories, device plates, lighting fixtures, factory-finished work and similar items, or provide in-place protection. Upon completion of each space, replace removed items.

Q. Unless otherwise indicated, paint exposed structural system.

R. Back prime finish carpentry with material specified for prime coat, without runs on face. Finish cut edges prior to installation.

S. Unless otherwise indicated, paint construction on roof top, including prefinished mechanical and electrical equipment.

T. Unless otherwise indicated, paint ground mounted mechanical, plumbing and electrical equipment, including prefinished equipment.

U. The following surfaces do not require painting:
1. Face brick.
2. Architectural precast concrete.
3. Prefinished and factory-finished surfaces and items, except where indicated otherwise.
4. Concealed ductwork, conduit and piping.

3.3 EXTERIOR PAINT SCHEDULE:

A. Concrete (Other Than Concrete Unit Masonry): Provide the following finish systems over exterior concrete, stucco, and brick masonry substrates.
   1. Flat acrylic finish:
      a. First coat: PPG; 4-603 Perma-Crete Int/ Ext Alkali Resistant Primer (88 g/L VOC); 1.2 to 1.5 Dry Mils.
      b. Second coat: PPG; 6-610XI Series SpeedHide Exterior Flat Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.
      c. Third coat: PPG; 6-610XI Series SpeedHide Exterior Flat Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.

B. Concrete unit masonry (New): Provide the following finish systems over exterior concrete unit masonry:
   1. Flat acrylic finish:
      a. First coat: PPG; 6-7 SpeedHide Int/Ext Masonry Block Filler Latex (<50 g/L VOC): 7.1 Dry Mils.
      b. Second coat: PPG; 6-610XI Series SpeedHide Exterior Flat Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.
      c. Third coat: PPG; 6-610XI Series SpeedHide Exterior Flat Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.

C. Smooth wood: Provide the following finish systems over smooth wood siding, wood trim, and other smooth exterior wood surfaces:
   1. Flat acrylic finish:
      a. First coat: PPG; 6-609 SpeedHide Exterior House and Trim Wood Primer Flat (89 g/L VOC); 1.6 Dry Mils.
      b. Second coat: PPG; 6-610XI Series SpeedHide Exterior Flat Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.
      c. Third coat: PPG; 6-610XI Series SpeedHide Exterior Flat Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.

D. Wood trim: Provide the following finish systems over exterior wood trim:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 6-609 SpeedHide Exterior House and Trim Wood Primer Flat (89 g/L VOC); 1.6 Dry Mils.
      b. Second coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.
      c. Third coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.

E. Plywood: Provide the following finish systems over exterior plywood:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 6-609 SpeedHide Exterior House and Trim Wood Primer Flat (89 g/L VOC); 1.6 Dry Mils.
      b. Second coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.
      c. Third coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.

F. Ferrous metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 90-712 Series Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel (123 g/L VOC compliant as anti-corrosive product); 2.0 to 3.0 Dry Mils.
      b. Second coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.
      c. Third coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.

G. Zinc-coated metal: Provide the following finish systems over exterior zinc-coated metal surfaces:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 90-712 Series Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel (123 g/L VOC compliant as anti-corrosive product); 2.0 to 3.0 Dry Mils.
      b. Second coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.
      c. Third coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.

H. Aluminum: Provide the following finish systems over exterior aluminum surfaces:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 90-712 Series Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel (123 g/L VOC compliant as anti-corrosive product); 2.0 to 3.0 Dry Mils.
      b. Second coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.
      c. Third coat: PPG; 6-900XI Series SpeedHide Exterior House and Trim Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.

I. Ferrous metal (Factory coated) – Canopy and support:
   1. Surface preparation: Surfaces shall be rendered clean, dry and free from dirt, loose paint, oil, grease, chalk, wax, rust, loose mill scale and other contamination per method SSPC-SP2 or SP3 Hand Tool or Power Tool Cleaning.
      a. Dull glossy surfaces by sanding or best available means. Sanding dust and residual contamination shall be removed from the surface before painting.
      b. Spot prime rusty areas on the steel prior to coating with PPG 6-208 Speedhide Interior Exterior Rust Inhibitive Steel Primer.
      c. Prime bare steel areas with PPG 6-208 Speedhide Interior Exterior Rust Inhibitive Steel Primer (if ferrous metal) or with PPG 90-712 Pitt-Tech Int./Ext. Primer/Finish DTM Industrial Enamel (if galvanized steel).
      d. Follow all additional surface preparation guidelines on technical data sheets.
   2. First coat (Primer) (Full coat over spot primer recommended above): PPG; 17-921 Series Seal Grip Interior Exterior Universal Acrylic Primer @ 1.6 mils DFT.
   3. Second coat: PPG; 90-1210 Series Pitt-Tech® Plus Int./Ext. DTM Industrial Semi Gloss Enamel @ 2 .0 – 4.0 mils DFT.
   4. Third coat: PPG; 90-1210 Series Pitt-Tech® Plus Int./Ext. DTM Industrial Semi Gloss Enamel @ 2 .0 – 4.0 mils DFT.

J. Metal building panels (Previously painted) – Metal siding (Heavily chalked):
   1. Surface preparation: Surfaces must be rendered clean, dry and free from dirt, loose paint, oil, grease, chalk, wax, rust, loose mill scale and any other contamination per method SSPC-SP2 or SP3 Hand Tool or Power Tool Cleaning.
      a. Removal of chalk residue must be addressed specifically.
      b. Dull glossy surfaces by sanding or best available means. Sanding dust and residual contamination shall be removed from the surface before painting.
      c. Spot prime rusty areas with PPG 6-208 Speedhide Interior Exterior Rust Inhibitive Steel Primer.
      d. Prime bare steel areas with PPG 6-208 Speedhide Interior Exterior Rust Inhibitive Steel Primer (if ferrous metal) or with PPG 90-712 Pitt-Tech Int./Ext. Primer/Finish DTM Industrial Enamel (if galvanized steel).
      e. Follow additional surface preparation guidelines on technical data sheets.
   2. First coat (Primer) (Full coat over spot primer recommended above): PPG; 4-808/809 Series Perma Crete Interior/Exterior Acrylic Masonry Surface Sealer @ 1.3 mils DFT.
   3. Second coat: PPG; 90-1210 Series Pitt-Tech® Plus Int./Ext. DTM Industrial Semi Gloss Enamel @ 2 .0 – 4.0 mils DFT.
   4. Third coat: PPG; 90-1210 Series Pitt-Tech® Plus Int./Ext. DTM Industrial Semi Gloss Enamel @ 2 .0 – 4.0 mils DFT.

K. Concrete masonry units (Previously painted):
   1. Surface preparation: Surface must be clean, dry and free from dirt, loose paint, oil, grease, wax, chalk, efflorescence, mildew, dust, excess or splattered mortar, and other contamination.
      a. Damaged areas and moisture sources shall be repaired and corrected prior to priming and painting.
      b. Sand painted surfaces to dull existing gloss. Following sanding, remove sanding dust from surface.
      c. Following removal of loose and peeling paint, spot fill bare block areas prior to priming.
      d. Follow additional surface preparation guidelines on technical data sheets.
   2. Block filler (Spot fill BARE BLOCK ONLY): PPG; 6-7 Series Speedhide Interior Exterior Masonry Latex Block Filler applied at the spread rate required to fill the pores of the block.
   3. First coat (Primer): PPG; 17-921 Series Seal Grip Interior Exterior Acrylic Universal Primer @ 1.6 mils DFT.
   4. Second coat: PPG; 4-22 Perma-Crete High Build 100% Acrylic Topcoat @ 3.2 to 5.8 mils DFT.
   5. Third coat: PPG; 4-22 Perma-Crete High Build 100% Acrylic Topcoat @ 3.2 to 5.8 mils DFT.

3.4 INTERIOR PAINT SCHEDULE:

A. Concrete (Other Than Concrete Unit Masonry): Provide the following paint systems over interior concrete and brick masonry substrates:
   1. Flat acrylic finish:
      a. First coat: PPG; 4-603 Perma-Crete Int/ Ext Alkali Resistant Primer (88 g/L VOC); 1.2 to 1.5 Dry Mils.
      b. Second coat: PPG; 6-70 Series SpeedHide Interior Wall Flat Latex (<50 g/L VOC); 1.3 Dry Mils.
      c. Third coat: PPG; 6-70 Series SpeedHide Interior Wall Flat Latex (<50 g/L VOC); 1.3 Dry Mils.

B. Concrete masonry unit: Provide the following finish systems over interior concrete masonry:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 6-7 SpeedHide Int/Ext Masonry Block Filler Latex (<50 g/L VOC): 7.1 Dry Mils.
      b. Second coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.
      c. Third coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.4 Dry Mils.

C. Gypsum board: Provide the following finish systems over interior gypsum board surfaces:
   1. Flat acrylic finish:
      a. First coat: PPG; 6-2 SPEEDHIDE Interior Latex Sealer Quick-Drying (<50 g/L VOC); 1.0 Dry Mils.
      b. Second coat: PPG; 6-70 Series SpeedHide Interior Wall Flat Latex (<50 g/L VOC); 1.3 Dry Mils.
      c. Third coat: PPG; 6-70 Series SpeedHide Interior Wall Flat Latex (<50 g/L VOC); 1.3 Dry Mils.
   2. Low-luster acrylic finish:
      a. First coat: PPG; 6-2 SPEEDHIDE Interior Latex Sealer Quick-Drying (<50 g/L VOC); 1.0 Dry Mils.
      b. Second coat: PPG; 6-411 Series SpeedHide Interior Enamel Eggshell Latex (<50 g/L VOC); 1.5 Dry Mils.
      c. Third coat: PPG; 6-411 Series SpeedHide Interior Enamel Eggshell Latex (<50 g/L VOC); 1.5 Dry Mils.

D. Wood: Provide the following paint finish systems over new interior wood surfaces:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 17-951 PPG SEAL GRIP Interior Primer/Finish (45 g/L VOC); 1.2 Dry Mils.
      b. Second coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.
      c. Third coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.

E. Ferrous metal: Provide the following finish systems over ferrous metal:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 90-712 Series Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel (123 g/L VOC compliant as anti-corrosive product); 2.0 to 3.0 Dry Mils.
      b. Second coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.
      c. Third coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.

F. Zinc-coated metal: Provide the following finish systems over interior zinc-coated metal surfaces:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 90-712 Series Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel (123 g/L VOC compliant as anti-corrosive product); 2.0 to 3.0 Dry Mils.
      b. Second coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.
      c. Third coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.

G. Aluminum: Provide the following finish systems over interior zinc-coated metal surfaces:
   1. Semi-gloss acrylic-enamel finish:
      a. First coat: PPG; 90-712 Series Pitt-Tech Int/Ext Industrial DTM Primer/Finish Enamel (123 g/L VOC compliant as anti-corrosive product); 2.0 to 3.0 Dry Mils.
      b. Second coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.
      c. Third coat: PPG; 6-500 Series SpeedHide Interior Semi-gloss Acrylic Latex (<50 g/L VOC); 1.5 Dry Mils.

H. Dry fog coating for exposed structural system, including joists, beams and metal decking; alkyd enamel; number of coats specified are minimum:
   1. First coat:
      a. Ferrous metals: 90-712 Series PPG Pitt Tech Interior/Exterior DTM Waterborne Acrylic Primer/Finish.
      b. Galvanized metals and aluminum: No primer required.
   2. Second coat: 6-725 XI Speedhide Interior Super Tech WB Acrylic Dry-Fog Flat Finish.
   3. Third coat: 6-725 XI Speedhide Interior Super Tech WB Acrylic Dry-Fog Flat Finish.

End of Section

SECTION 10 2813

TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work specified elsewhere:
1. Concrete unit masonry.
2. Gypsum board.
3. Toilet compartments.

1.2 DESIGN CRITERIA:

A. In order to be acceptable, products shall comply with the following criteria:
1. All accessories shall be products of a single manufacturer.
2. Keying: Keyed accessories shall be keyed alike, unless otherwise specified.
3. Operation: Control and operating mechanisms shall be operable with one hand, without tight grasping, pinching, or twisting of wrist, and with a maximum force of 5 lbf.
4. Cabinet construction:
a. Material: Entire cabinet shall be constructed of 18-8 S, Type 304 stainless steel, minimum 22 ga., except that doors of flush face cabinets shall be minimum 18 ga.
b. Finish: Satin finish, vertical grain stainless steel; matching in color and graining within the same cabinet.
c. Unit construction: Seamless or welded; welds ground smooth prior to finishing on exposed surfaces. Cabinets shall have full, continuous backs and sides. Flush face units shall be seamless construction.
d. Hinges: Doors shall be hung on continuous stainless steel piano hinges.
e. Stops: Doors shall have spring or cable stops located inside cabinet to limit opening to 120 degrees maximum.
f. Bumpers: Doors shall have rubber bumpers to cushion door closing.
g. Exposed edges: Hemmed, returned or flanged; sharp edges not allowable.
h. Waste receptacle liners: Rigid, leakproof, molded plastic.
i. Paper towel dispensers: Adaptable to dispense C-fold, multi-fold or single-fold towels without use of additional towel trays.
j. Feminine napkin/tampon vendors: Changeable coin mechanisms and coin slot identification; lockable coin box keyed differently from other accessories.
5. Soap dispensers:
a. Valves: All-purpose dispensing type; piston and exposed components of Type 302/304 stainless steel or chrome-plated brass.
b. Lavatory-mounted dispensers: Capable of being filled from top, without removal of container.
c. Lavatory dispenser container: Minimum 32 oz. capacity, rigid polyethylene.

1.3 SUBMITTALS:

A. Product data: Include catalog cuts and data sheets indicating size, material and finish, complete parts list and installation procedures for each accessory. Where manufacturer's standard products vary with design criteria, indicate compliance with design criteria.

B. Samples: Submit one actual sample of each accessory for approval if requested by Architect. Upon approval, samples will be returned for incorporation into project.

1.4 QUALITY ASSURANCE:

A. Applicable standards; comply with the following as referenced herein: Americans with Disabilities Act (ADA).

1.5 PROJECT/SITE CONDITIONS:

A. Protection: Maintain manufacturer's protective covering on accessories until final cleanup of installation.

B. Coordinate this work with work of other trades into which accessories are to be installed.

1.6 WARRANTY:

A. Mirrors: Warrant mirrors for five years against silver spoilage.

PART 2 - PRODUCTS

2.1 TOILET ACCESSORIES:

A. Acceptable manufacturers; subject to compliance with specified design criteria:
1. AJW Architectural Products.
2. American Specialties, Inc. (ASI).
3. Bobrick Washroom Equipment, Inc.
4. Bradley Washfountain Co.

B. The basis of design for toilet accessories is scheduled on drawings. Toilet accessories of similar design and construction, as manufactured by other acceptable manufacturers, may be submitted for Architect's consideration. Acceptance is subject to compliance with specified design criteria, as evidenced by submittal of specified product data, and Architect’s approval.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Check opening scheduled to receive recessed or semi-recessed accessories for correct dimensions, depth, plumbness of blocking or frames, and preparation that would affect installation of accessories.

3.2 INSTALLATION:

A. Install accessories level, plumb and in indicated location. Installation methods shall be as indicated in product data for substrates encountered. Securely attach to blocking or framing members.

B. Mounting heights: As indicated on drawings and meeting ADA accessibility requirements.

C. Grab bars:
1. Secure grab bars to wood by direct attachment to blocking installed between studs.
2. Secure grab bars to metal stud partition by direct attachment to steel studs, using 1/4" diameter toggle bolts, or using minimum 12 ga. by 3" wide steel anchor plates, continuous length required for attachment of grab bar flanges.
   a. Attach anchor plates to studs on grab bar side of wall, using self-tapping sheet metal screws.
   b. Where grab bar flanges mount on separate walls, anchor plate shall be of length to span between studs at individual flange locations.
   c. Attach grab bars to anchor plates using stainless steel machine screws.
3. Attach grab bars to masonry walls using concealed mounting plate, minimum 1/4" diameter through-bolt and minimum 10 ga. steel backup plate.
4. Attach grab bars to concrete walls using 1/4" diameter stainless steel machine screws and metal expansion shields.
5. Attach grab bars to toilet partitions using wing tapped steel spacers and stainless steel machine screws. Where grab bar is attached to one side of partition only, spacer shall have minimum 16 ga. satin finish stainless steel backup plate.

D. Conceal evidence of drilling, cutting and fitting to adjacent finishes.

3.3 ADJUSTING AND CLEANING:

A. Adjust operating parts of accessories for proper operation.

B. Clean and polish exposed surfaces prior to Date of Substantial Completion.

C. Deliver accessory schedule, keys and parts manual as part of project closeout documents.

End of Section

SECTION 10 4400

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY:

A. Related work specified elsewhere:
1. Gypsum board systems.
2. Concrete unit masonry.
3. Painting and coating.

1.2 SUBMITTALS:

A. Shop drawings: Indicate extinguisher location, size, mounting height and method of installation. Show cabinet installation details, including fire protection enclosure where cabinet is located in fire-rated wall assembly.

B. Product data: Indicate material types, finishes, ratings, hardware, sizes, fabrication and installation details. Include sample of cabinet door sign.

1.3 QUALITY ASSURANCE:

A. Applicable standards; standards of the following as referenced herein:
1. ASTM International (ASTM).
2. Americans with Disabilities Act (ADA).
3. Factory Mutual (FM).
4. Underwriters Laboratories, Inc. (UL).
5. Inchcape Testing/Warnock Hersey (WH).

1.4 DELIVERY, STORAGE AND HANDLING:

A. Deliver and store in protective packaging to prevent soiling and physical damage.

B. Handle to prevent damage to finished surfaces and operating mechanisms.

1.5 PROJECT/SITE CONDITIONS:

A. Protection: Protect prefinished surfaces from damage or staining. Provide protective covering following installation for duration of project.

1.6 INSPECTION SERVICE:

A. Extinguishers shall have an inspection certification tag attached, indicating date of charge and service agent's name and address. Charge date shall not be earlier than sixty days prior to Date of Substantial Completion. Service agent shall be located within 50 miles of project.

B. Provide an inspection service agreement for inspection and servicing of extinguishers for one year following date of initial charge, as well as for servicing and recharging extinguishers failing to hold charge within the initial one-year period. Recharging extinguishers due to use or vandalism shall not be included in service agreement.

PART 2 - PRODUCTS

2.1 PORTABLE FIRE EXTINGUISHERS:

A. Acceptable manufacturers; subject to compliance with specified requirements:
1. J. L. Industries, Inc., an Activar Construction Products Group, Inc. Company.
2. Larsen Manufacturing Co.
3. Nystrom, Inc.
4. Potter Roemer - Fire Protection Equipment, a division of Morris Group International.

B. Dry chemical type in steel container: UL-rated 4A:80B:C, 10-lb nominal capacity, multi-purpose dry chemical in enameled-steel container.

C. Container characteristics:
1. Label: UL and FM.
2. Accessories: Pressure-indicating gauge, hose and nozzle.
3. Operation: Pull-pin and squeeze grip for multiple controlled release.

2.2 FIRE EXTINGUISHER BRACKETS:

A. Description: Manufacturer's standard wall bracket designed to support extinguisher securely in vertical position on wall or centered in cabinet.

2.3 TRIMMED SEMI-RECESSED AND RECESSED CABINETS:

A. Acceptable products; subject to compliance with specified requirements:
1. J. L. Industries, Inc., an Activar Construction Products Group, Inc. Company, Ambassador.
2. Larsen’s Manufacturing Co., Architectural Series.
3. Nystrom, Inc., Alpine Series.
4. Potter Roemer - Fire Protection Equipment, a division of Morris Group International., Alta Series.

B. Characteristics:
1. Type: Recessed and semi-recessed cabinet as required to fit construction conditions.
2. Cabinet: Minimum 20 ga. cold-rolled steel, one-piece formed construction, prefinished in manufacturer's standard white baked enamel.
3. Size: Coordinate cabinet size to accept fire extinguisher.
4. Door:
a. Style: Solid panel.
b. Construction: Roll-formed, one-piece tubular construction formed from minimum 20 ga. cold-rolled steel, baked enamel coating suitable for receipt of field paint finish.
5. Trim:
a. Type: Maximum 1-1/2" square projecting corner trim semi-recessed installation.
b. Trim construction: Roll-formed, one-piece tubular construction formed from minimum 20 ga. cold-rolled steel, baked enamel coating suitable for receipt of field paint finish.
6. Hardware: Full length piano hinge, roller catch.
7. Pull: Pulls shall comply with ADA requirements. Provide manufacturer's standard pull handle.

8. Lettering: "FIRE EXTINGUISHER" decal or vinyl, self-adhering, pre-spaced lettering in size, color and vertical or horizontal orientation as selected by Architect. Supplied loose for application following field painting.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Coordination: Coordinate installation of built-in cabinets with wall construction.

3.2 CABINET INSTALLATION:

A. Install cabinets plumb and level, anchored to structural elements using not less than two anchors, each, top and bottom of each cabinet. Anchors shall be type and size recommended by cabinet manufacturer for substrate encountered, concealed within closed cabinet, with exposed heads finished to match cabinet interior.

B. Provide blocking built into walls at anchorage locations.

C. Where cabinet is installed in a fire-rated wall assembly, provide fire-rated wall construction around cabinet.

D. Conceal edges of rough opening into which cabinet is installed with cabinet assembly.

E. Mounting heights: As indicated on drawings and as follows:
1. Maximum forward reach to equipment shall be 4'-0" above finished floor level.
2. Maximum side reach to equipment shall be 4'-6" above finished floor level.
3. Mounting heights shall meet ADA and NFPA requirements.

F. Finishing:
1. Paint exposed surfaces of cabinet door and trim as specified in Painting and Coating section; colors as selected by Architect.
2. Apply "Fire Extinguisher" lettering to finished door. Lettering shall be straight, true and accurately spaced and aligned, free of wrinkles, bubbles, tears or other imperfections.

3.3 EXTINGUISHER INSTALLATION:

A. Install extinguishers at Date of Substantial Completion, indicating acceptable charge pressure and tagged to show charge date and service agent.

B. Install wall-hung extinguishers on wall mounting bracket. Secure bracket to wall structure with not less than two anchors.

C. Mounting heights: As indicated on the drawings and as follows:
1. Maximum forward reach to equipment shall be 4'-0" above finished floor level.
2. Maximum side reach to equipment shall be 4'-6" above finished floor level.
3. Mounting heights shall meet ADA and NFPA requirements.

D. Install cabinet-mounted extinguishers in cabinets using wall mounting bracket attached to back wall of cabinet.

E. Install and secure extinguishers in plumb, vertical position with name and operating instructions visible on front of extinguisher.

3.4 CLEANING AND PROTECTION:

A. Protect installed equipment and finished surfaces from damage or defacement. Replace items which cannot be repaired to satisfaction of Architect.

B. Prior to date of Substantial Completion, clean and polish interior and exterior surfaces.

3.5 EXTINGUISHER SCHEDULE:

A. Provide 10 lb. multi-purpose type extinguishers in recess or semi-recess mounted cabinet in locations as indicated or as directed by Architect.

End of Section

SECTION 22 0002

PLUMBING SPECIFICATIONS

PART 1 GENERAL

1.01 REGULATORY REQUIREMENTS

A. Where requirements of these specifications exceed specified codes and ordinances, conform to these specifications.

B. Materials and equipment included in Underwriters Label Service shall bear that label. Electrical equipment shall be U.L. approved as installed.

C. Jurisdiction: Where codes or guides refer jurisdiction to local governing code officials, such official in this procedure shall be the City Building Official.

D. Permits: Obtain all permits, paying all fees in connection therewith. At completion, have work inspected by proper authorities and furnish the Architect for the Owner an inspection certificate showing approval of installation.

E. Plumbing: Conform to the SBCCI Standard Plumbing Code (International Plumbing Code), 2012 edition, with all Georgia State Amendments.

F. Fire Prevention Precautions in Cutting and Welding Areas: Conform to Article 2605 Fire Prevention Precautions, SBCCI Standard Fire Prevention Code (International Fire Code), 2012 Edition, with all Georgia State Amendments, for all work involving cutting and welding.

G. Energy: Conform to the International Energy Conservation Code, 2009 Edition, with all Georgia State Amendments.

H. Electrical: Refer to Division 26. Conform to the National Electrical Code, NFPA 70, 2014.

I. Building Code: Conform to the SBCCI Standard Building Code (International Building Code), 2012 Edition with all Georgia State Amendments.

1.02 SUBMITTALS

A. The contractor shall submit the following for review by the Design Professional.

1. Plumbing Piping Insulation.

2. Plumbing Piping, Fittings and Valves.

3. Plumbing Fixtures and Accessories.

4. Plumbing Specialties

1.03 QUALITY ASSURANCE

A. The Contractor expressly warrants that the company performing the installation of the plumbing systems has demonstrated proficiency in the installation and adjustment of such systems by the successful performance of work of the nature specified herein on at least three commercial or institutional buildings, each containing water heating systems, pumping systems(i.e. hot water recirculation, sump pumps, or pressure booster pumps), and a minimum of 10 plumbing fixtures.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of documented experience.

C. Products specified this section to be installed in a potable water system anticipated for human consumption shall be in compliance with the amended Safe Drinking Water Act S.3874, to reduce lead in drinking water. "Reduction of Lead in Drinking Water Act". 0.25% allowable lead content.

D. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

1.04 DELIVERY, STORAGE, AND PROTECTION

A. Accept all products on site in factory-fabricated protective containers. Inspect for damage.

B. Store products in a clean dry place and protect from weather and construction traffic.

C. Handle products carefully to avoid damage to components, enclosures, and finish.

D. After placement, protect products from damage during construction, by all trade contractors.

E. Protect equipment nameplates and labels from damage, being painted, scaring, etc.

1.05 WARRANTY

A. Provide five year manufacturer warranty for electric water cooler from Final Observation.

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

C. Where extended warranties beyond the Contractor's one (1) year warranty are specified, the additional warranty time shall start at the end of the Contractor's warranty.

D. Correct defective Work for a one year period after Date of Completion.

1.06 INSTALLATION

A. Clearance above and in front of electrical switchgear, electrical power panels or control panels shall be maintained by mechanical systems so that no pipes, vents, or equipment is routed above or across the space directly above this equipment in conformance with the National Electrical Code.

B. Install and connect all appliances, equipment, and appurtenances as specified, indicated or required in accordance with the manufacturer's instructions and recommendations. Furnish and install complete auxiliary piping, water seals, valves, electric connections, and similar items, recommended by the manufacturer or as required for proper operation.

C. Pipe Sleeves in Slabs, Masonry Walls and Partitions:

1. Masonry Partitions: Schedule 40 black steel pipe: Sleeves shall be sized to include the insulation with minimum gap around insulation. Install, without developing a break in the pipe insulation, according to the fire sealant manufacturer's installation instructions for a U.L. Listed assembly for a rated pipe penetration through a rated masonry wall/partition.

2. Omit sleeves in openings core drilled in masonry partitions.

3. Rated Drywall Partitions: Twenty gage galvanized steel. Sleeves shall be sized to include the insulation with minimum gap around the insulation. Install, without developing a break in the pipe insulation, according to the fire sealant manufacturer's installation instructions for a U.L. Listed assembly for a rated pipe penetration through a rated drywall wall/partition.

4. Non-Rated Drywall Partitions: Omit sleeves.

1.07 PIPING PRESSURE TESTS

A. General:

1. Provide 48 hours notification to the Architect in advance of any test.

2. Complete tests prior to insulating. Leaks shall be repaired, defective materials replaced, and system shall be retested. Strike all joints in copper and steel piping under a pressure test. Conduct tests prior to connecting to equipment or isolate equipment from system.

3. No water pressure test shall be conducted in freezing weather where subject to freezing.

4. Test shall be maintained at conditions specified until approved but, in no event, for less than eight (8) hours minimum duration, unless otherwise noted.

5. Hydrostatic pressure tests shall maintain pressure without change, except that due to temperature change.

B. Domestic Water System: Hydrostatic test; 150 PSIG

C. Soil, Waste and Vent System: Static test; 10 feet minimum head. Test system in its entirety or in sections. Plug all openings except highest opening above the roof. Water shall be kept in the system, or in the portion under test, for a minimum of one (1) hour. Inspect the system, or the portion under test, after one (1) hour, the system shall be tight at all points.

PART 2 PRODUCTS

2.01 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

A. Pipe Markers

1. Manufacturers: Brimar, Seton Name Plate Co Setmark, Kolbi Industries Style A thru E(5 inch and smaller) else Style F thru H, Marking Services.

2. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

B. Install Pipe Markers on all piping systems at the following Locations:

1. Mechanical Equipment Rooms:

a. Within 18 inches of each valve.

b. Within 36 inches of each 90 elbow, tee, connection to equipment or vessel and point where pipe exits room.

c. At not over 20 feet intervals along all exposed piping.

2. Above Suspended Ceilings:

a. Within 18 inches of each valve or valve assembly.

b. At tees, identify both main and branch within 36 inches of tee.

c. Within 36 inches of each 90 elbow.

d. At not over 30 feet intervals along all concealed piping.

2.02 PLUMBING PIPING INSULATION

A. Glass Fiber (RIGID)

1. Manufacturers:

a. Johns Manville Corporation: www.jm.com.

b. Owens Corning Corp: www.owenscorning.com.

c. CertainTeed Corporation: www.certainteed.com.

2. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.

a. 'K' value: ASTM C 177, 0.24 at 75 degrees F (0.035 at 24 degrees C).

b. Maximum service temperature: 650 degrees F.

c. Maximum moisture absorption: 0.2 percent by volume.

3. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

4. Vapor Barrier Lap Adhesive:

a. Compatible with insulation.

5. Insulating Cement/Mastic:

a. ASTM C195; hydraulic setting on mineral wool.

6. Insulating Cement:

a. ASTM C449/C449M.

B. Piping Concealed and Exposed Above 10ft Above Finished Floor - Domestic Cold, Hot and Return piping: 1 inch thick rigid glass fiber with factory ASJ jacket.

2.03 PLUMBING PIPING

A. Soil, Waste and Vent Piping:

1. Below Slab on Grade Cast Iron Pipe: ASTM A 74, service weight below floor.

a. Fittings: Cast iron.

b. Joint Seals: ASTM C 564 gaskets.

2. Above Slab on Grade Cast Iron Pipe: CISPI 301 or ASTM A888, hubless, above floor.

a. Fittings: Cast iron.

b. Joints: Shielded Couplings ASTM C 1277 Assembly: CISPI 310 and ASTM C 1540-04, with stainless steel shield, stainless steel clamp and tightening devices, and ASTM C 564 rubber sleeve.

1) Manufacturers - 1½" thru 3": Medium Duty: Mission Heavyweight, Husky HD 2000; Clamp-ALL-80, Tyler Wide Body, Ideal HD.

2) Manufacturers - 4" thru 10": Heavy Duty: Husky SD 4000; Clamp-ALL-120.

B. Water Piping, Above Slab on Grade

1. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).

a. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.

b. Fittings: ASME B16.18, ASME B16.22, wrought copper and bronze.

c. Joints: ASTM B32, alloy Sn95 solder.

C. Pipe Hangers and Supports

1. Provide hangers and supports that comply with MSS SP-58.

2. Manufacturers: Anvil, B-Line, Grinnell, Globe or Michigan. Figure numbers are for Michigan.

3. Plumbing Piping - Drain, Waste, and Vent:

a. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis. Figure 400.

4. Plumbing Piping - Water:

a. Conform to ASME B31.9.

b. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Adjustable swivel, loop.

c. Copper Pipe Support: Adjustable Loop, copper plated.

5. Pipe Hanger Spacing:

a. Metal Piping:

1) Copper Pipe size: 1/2 inches to 1-1/4 inches:

(a) Maximum hanger spacing: 5 ft.

(b) Hanger rod diameter: 3/8 inches.

2) Copper Pipe size: 1-1/2 inches to 4 inches:

(a) Maximum hanger spacing: 8 ft.

(b) Hanger rod diameter: 3/8 inch.

3) Waste/Vent Pipe size: 2 inches to 3 inches:

(a) Maximum hanger spacing: 8 ft.

(b) Hanger rod diameter: 1/2 inch.

D. Ball Valves

1. Up To and Including 2-1/2 Inches:

a. Manufacturers:

1) Apollo; Model 64 Series

2) Ferguson; Model 420

3) Milwaukee; Model BA-475B

2. MSS SP-110, NSF-61, 150 WSP, 600 psi WOG, Brass or Bronze two piece body, Full port, chrome plated brass ball, reinforced teflon seats and stuffing box ring, blow-out proof stem design, adjustable packing gland, zinc coated steel lever handle with vinyl hand grip., threaded ends.

2.04 PLUMBING SPECIALTIES

A. WATER HAMMER ARRESTORS

1. Manufacturers: Unit Size: ‘A’

a. Jay R. Smith Manufacturing Company; Model 5005.

b. Zurn Industries, Inc.; Model 1700-100.

2. Water Hammer Arrestors:

a. ANSI A112.26.1M Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psi working pressure. Locate valve(s) above ceiling height of adjacent space.

2.05 PLUMBING FIXTURES

A. FLUSH VALVE WATER CLOSETS

1. FIXTURE 'WC1'; WATER CLOSET (FM, FV (1.28 gpf), ADA)

a. Bowl:

1) Manufacturers:

(a) American Standard Inc.; Model 3043.001: www.americanstandard.com.

(b) Kohler Company; Model K-4405: www.kohlerco.com.

(c) Toto; Model CT705ELN: www.totousa.com.

(d) Sloan; Model ST-2020-A-1.28: www.sloanvalve.com.

(e) Zurn; Model Z-5665: www.zurn.com.

2) ASME A112.19.2M; 1.28 gpf, floor mounted vitreous china closet bowl, with elongated rim, 1-1/2 inch top spud, china bolt caps; disabled access.

b. Fixture Accessories:

1) Seat: Type 1St; See SEATS.

2) Flush Valve (1.28gpf): Type 3FV; See FLUSH VALVES.

B. LAVATORIES

1. FIXTURE 'LV 1'; LAVATORY (WH, VC, ADA)

a. Lavatory Basin:

1) Manufacturers:

(a) American Standard; Model 0355.012

(b) Kohler; Model K-2005

(c) Zurn; Model Z5344

2) ASME A112.19.2M; vitreous china, wall hung, 21" x 18" fixture with drillings on 4-inch centers, front overflow, soap depression, drilled for concealed arm carrier, disabled accessible.

b. Accessories:

1) Faucet: Type 3F; See FAUCETS

2) Drain: Type 2D; See DRAINS.

3) Supplies: Type SS1; See SUPPLY STOPS.

4) Trap: Type 1T; See TRAPS.

5) Carrier: See CARRIERS; Concealed Arm Type.

6) Insulation: See FIXTURE INSULATION.

C. FIXTURE ACCESSORIES

1. Flush Valves

    a. Type 3FV (Standard & ADA Electronic Water Closet Valve- Piston Type)

        1) Manufacturers:

            (a) Sloan; Gem 2 111-1.28-SMO-YBYC-YK

            (b) Zurn; Model ZTS-6200EV-YB-YC-YK

            (c) Toto; Model TET1LN32

            (d) American Standard; Model 6065.121.002

            (e) Kohler; Model K-10956

        2) ASME A112.18.1; Exposed chrome plated piston or turbine type with 6VDC-4AA battery powered infrared sensor operated flush valve with heavy duty escutcheon with set screw, integral screwdriver stop, vacuum breaker; 1 1/2-inch top spud, 11 1/2-inches high; 1 solid-ring pipe support; 1.28gpf maximum flush.

2. SEATS

    a. Type 1St.; Seat (Elongated, open front, less lid, white)

        1) Manufacturers:

            (a) Bemis; Model 1655SSC

            (b) Kohler; Model K-4666-S-C

            (c) Zurn; Model Z-5955-SS-LL

        2) Extra heavy weight, injection molded solid plastic, open-front, less lid, molded bumpers, external check hinges and stainless steel posts.

3. FAUCETS

    a. Type 3F (Single Lever - Lavatories)

        1) Manufacturers:

            (a) American Standard; Model 2385.006

            (b) Zurn; Model Z-81000

        2) ASME A112.18.1M; Chrome plated brass combination supply fitting with standard chrome plated brass handles, ADA, standard spout, aerator, 0.5 gpm; less drain.

4. DRAINS

    a. Type 2D (Flat grid off-set drain - Lavatories)

        1) Manufacturers:

            (a) Kohler; Model K-13885

            (b) McGuire; Model 155-WC

            (c) Zurn; Model Z-8746

        2) ASME A112.18.1M; 1 1/4" inch diameter chrome plated brass flat grid type drain with offset 17-gauge tailpiece.

5. SUPPLY STOPS

    a. Type SS1 (3/8"-inch, 1/4 turn; Loose Key; Lavatories/Sinks/Electric Water Coolers)

        1) Manufacturers:

            (a) Brasscraft; Model KTSR17XC

            (b) Chicago; Model 1006-MMABCP

            (c) McGuire; Model LFHST02LK

            (d) Zurn; Model ZH8822-XL-LR-LK-PC

        2) ASME A112.18.1M; Chrome plated brass angle heavy duty stop or ball stop, removable actuator key; supply tubing and escutcheon plate.

6. TRAPS

    a. Type 1T (1 1/4"-inch Adj. 'P')

        1) Manufacturers:

            (a) Kohler; Model K-9000

            (b) McGuire; Model 8872

            (c) Zurn; Model Z-8700

        2) ASME A112.18.1M; Chrome plated cast brass, 17-gauge P-trap assembly with cast brass nuts, cleanout plug and heavy duty escutcheon.

7. CARRIERS

a. Lavatories

1) Type C10 'Single'

(a) Manufacturers:

(1) Josam; Model 17100-63

(2) JR Smith; Model 700-M31

(3) Zurn; Model Z-1231-D

(4) Mifab

(5) Wade

(6) Watts

b. Electric Water Coolers

1) Type C12 'Single'

(a) Manufacturers:

(1) Josam; Model 17900

(2) JR Smith; Model 830-M31

(3) Mifab; Model MC-30

(4) Wade; Model W-420-AM11

(5) Watts; Model CA-421

(6) Zurn; Model ZR-1225

c. Carrier Notes:

1) Carriers shall be manufactured in accordance with ASME A112.18.2 standards.

2) All carriers shall be bolted to the floor with lag bolts.

8. FIXTURE INSULATION

a. Manufacturers:

1) McGuire; Model 'Pro-Wrap' Series

2) Plumberex; Model Pro-2000 Series

3) Zurn; Model 'Trap Wrap' Series

b. Insulation assembly shall be for supply stops & tubing; drains (including off-sets) and P-traps under all ADA lavatories and counter sinks.

c. ANSI A117.1, ADA4.19.4; Fully molded, anti-bacterial flexible vinyl insulation assembly, minimum 1/8"-inch wall thickness, white in color, self-extinguishing meeting ASTM D635, and have a K-value of 1.17.

PART 3 EXECUTION

3.01 INSTALLATION

A. Each type of pipe installed shall be by the same manufacturer throughout the building.

B. Each type of fittings installed shall be by the same manufacturer throughout the building.

C. Install in accordance with manufacturer's instructions.

D. Equipment and pipe support upper attachments shall be 3" x 3" x 1/4" steel angles, minimum, spanning structural members unless noted otherwise. Provide inserts and bolts for supporting pipes and equipment from structural members. Attachments shall be to top cord of bar joists. Attach to beams with beam clamps. DO NOT support from roof deck.

E. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

F. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

G. Maintain 4 inch clearance between pipe and fittings after insulation.

H. Group piping whenever practical at common elevations.

I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

J. Establish elevations of buried piping outside the building to ensure not less than 3 ft. of cover.

K. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.

L. Flush all debris and pipe compound from domestic water system.

M. Install valves in a readily accessible location.

N. Install valves with stems upright or horizontal, not inverted

O. Pipe Hangers and Supports:

1. Support horizontal piping as scheduled.

2. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

3. Place hangers within 12 inches of each horizontal elbow.

4. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

6. Use double nuts and lock washers on threaded rod supports.

7. Provide copper plated hangers and supports for copper piping where hanger is in contact with tubing.

P. Disinfection of Domestic Water Piping System:

1. Prior to starting work, verify system is complete, flushed and clean.

2. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

3. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

4. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

5. Maintain disinfectant in system for 24 hours.

6. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

7. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

8. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

Q. Plumbing Specialty Installation:

1. Install in accordance with manufacturer's instructions.

2. Install plumbing specialties in a readily accessible location.

3. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to, all fixtures and toilet batteries. Size and install in accordance with the (Plumbing and Drainage Institute Standard) PDI WH-201.

R. Fixture Installation:

1. Install each fixture with trap, easily removable for servicing and cleaning.

2. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons, as specified in Fixture Accessories.

3. Install components level and plumb.

4. Install and secure fixtures in place with wall supports and bolts.

5. Seal wall and floor mounted fixtures to wall and floor surfaces with silicon latex tile grout. Joints shall be finished smooth and flush, not depressed. Color to match fixture.

6. Solidly attach water closets to closet flange with solid brass bolts, washers and nuts. Provide wax ring sealant on closet flange. Lead flashing shall not be used.

S. CLEANING AND PROTECTION

1. Clean plumbing fixtures and equipment.

2. Do not permit use of fixtures.

END OF SECTION

SECTION 23 0510

GENERAL MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Definitions.

B. Quality Assurance Requirements and Installer Qualifications.

C. General Product Delivery and Storage.

D. Installer Warranty.

E. Submittal Procedures Supplementing Section 01 3000.

F. Operating and Maintenance Manuals.

G. Execution Requirements common to Division 23 systems.

H. Space Conditioning during Construction.

I. Starting equipment and Systems-General Requirements.

J. Training Requirements.

K. Cleaning Requirements.

L. Finishing Requirements.

1.2 RELATED SECTIONS

A. Section 01 3300 - Submittal Procedures, for submittal procedures.

B. Section 01 7000 - Execution Requirements, for additional submittal and warranty requirements.

C. Section 07 8413 - Penetration Firestopping.

D. Section 07 9200 - Joint Sealants.

E. Section 09900 - Painting and Coatings.

1.3 DEFINITIONS

A. Manufacturer's Representatives: Wherever MANUFACTURER'S REPRESENTATIVE is referred to in this division, said representative shall be regularly employed by the manufacturer to perform similar activities to those called for herein, which indicates his competence in that field of work.

B. Concealed: Where the word concealed is used in this Division, it shall mean items above ceilings, in attics, in crawl spaces, in chases, in tunnels, in cabinet work, and under counters or equipment so as to be not visible from an elevation of 5 feet at a horizontal distance of 10 feet.

C. Finished Spaces or Areas: Where finished spaces or areas are referred to in this Division, it shall mean all spaces except concealed spaces, mechanical rooms, or boiler rooms unless otherwise noted.

D. Provide: Furnish and install.

E. Control and Interlock Wiring: All wiring, both line voltage and low voltage, other than power wiring from an electrical distribution panel, through the primary control device, to the item of equipment.

F. Primary Control Device: That ONE device for any item of equipment which interrupts power flow during normal operation. Where magnetic starters are provided, they are the primary control. For items not switches by starters, the primary control device will be that ONE thermostat, time clock, manual switch, aquastat, P.E. switch, or relay performing the primary switching.

G. Diagrammatic: A drawing that shows arrangement and relations (as of parts).i.e.: A diagrammatic drawing uses symbols rather than pictorial representation of pipes, ducts, conduit and other items shown and is not necessarily to scale. Arrangement, location, and sizes shown are firm.

H. Readily Accessible: Items requiring maintenance shall be available for close approach for maintenance or use in a space, through an access door from floor elevation, or above a lay-in ceiling though an access point by maintenance staff safely standing on a ladder no taller than the ceiling.

I. Noted, Indicated or Shown: Where the terms "Noted", "Indicated" or "Shown" are used in these specifications, the words "in the specifications or on the plans" shall be inferred.

J. Detail: Where reference is made to a Detail, the Detail shall be on the plans unless otherwise noted.

K. Specifications: Where reference is made to these specifications, it shall be inferred in this Division of specifications.

L. Notification by the Contractor, and Instructions to the Contractor: Where reference is made in these specifications to notification by or instructions given to the Contractor, it shall be inferred that the Design Professional shall be the instructor or shall be notified, as the case exists.

M. Division or Section Reference: Where reference is made to another Division or Section within this Division, refer to specifications table of contents for Division, Section, or Page Number.

N. Flow Diagram: A single-line, two-dimension, non-scaled drawing depicting arrangement and sequence of equipment, valves, controls, thermometers, gauges, and other specialty devices in a pipe or duct system.

1.4 REGULATORY REQUIREMENTS

A. Where requirements of these specifications exceed specified codes and ordinances, conform to these specifications.

B. Materials and equipment included in Underwriters Label Service shall bear that label. Electrical equipment shall be U.L. approved as installed.

C. Permits and Codes: Refer to the General Conditions.

D. Fire Prevention Precautions in Cutting and Welding Areas: Conform to Article 2605 Fire Prevention Precautions, Georgia State Minimum Standard Fire Prevention Code (International Fire Code), 2012 Edition, with all Georgia State Amendments, for all work involving cutting and welding.

E. HVAC: Conform to the Georgia State Minimum Standard Mechanical Code, International Mechanical Code, 2012 Edition with all Georgia State Amendments.

F. Energy: Conform to the Georgia State Energy Code for Buildings, International Energy Conservation Code, 2009 Edition, with all Georgia State Amendments.

G. All Work: Conform to State of Georgia Chapter 120-3-3 "Rules of Safety Fire Commissioner, Rules and Regulations, January 30, 2014", and ADA.

H. Electrical: Refer to Division 26. Conform to the National Electrical Code, NFPA 70, 2014 Edition.

I. Building Code: Conform to the Georgia State Minimum Standard Building Code, International Building Code, 2012 Edition with all Georgia State Amendments.

1.5 SUBMITTALS

A. Supplementing Division 1 Administrative Requirements; the Contractor shall:

1. Identify all submittals by a cover sheet showing project name, specification section, drawing or detail number, room number, date, revision date, contractor and subcontractor's organization and project manager with phone number, the model, style and size of item being submitted with manufacturers' representative, salesman (or a preparer who can answer questions), and Preparer's phone number.

2. Prepare a master list of submittal proposed to be submitted on the project. This list shall be updated for each submission and shall be the first sheet(s) of the submission in the quantity that is submitted for review. The information and general format of the master list shall contain a Specification Section, Section Title, Item Description, Item Status and any comment.

3. Review the submittal data and check to ensure compliance with specifications prior to submitting.

    a. The Contractor agrees that submittals of equipment and material and shop drawings of equipment and material layouts required under provisions of these specifications and processed by the Design Professional are not Change Orders. The purpose of submittals is to demonstrate that the Contractor understands the design concept of

the project by indicating the equipment and materials he intends to furnish and install, and by detailing the installation he intends to achieve.

b. The Contractor shall conform to the requirements of the Contract Documents unless a change order is issued. The Contractor shall identify on each submittal that the submittal contains no deviations or the Contractor shall identify any proposed deviations.

c. Any submittal or shop drawing not conforming to the Contract Documents without this identification and notification shall be assumed to be marked "Revise and Resubmit" (the contractor acknowledges this by the submission), and the Contractor shall promptly resubmit said submittal so as to be in full compliance with the Contract Documents.

d. Failure of the Contractor to provide this information during the shop drawing phase shall make the Contractor responsible for all changes to achieve compliance with the Contract Documents without additional compensation.

4. Provide a Letter from the HVAC Contractor stating that they have checked all submittals for compliance with specifications.

5. Product Data:

a. Provide data specific to the product proposed indicating capacity data, all standard and optional features to be supplied and all accessories and options available for that product.

b. Manufacturers' standard drawings shall be modified by deletions or additions to show only items applicable to this project.

B. Deliver submittals to the Design Professional at the business address.

C. Digital Delivery of Submittals:

1. Submittal data may be posted to the NBP Engineers FTP site when agreed upon by the Design Professional and the Owner during the preconstruction phase. The Contractor will be provided with a project folder and a password.

2. Prepare the submittals as described above. Take steps to reduce submittal file size.

3. Do not scan in color or high resolution unless required for clarity.

4. Optimize any scans to help control file size.

5. Ensure any reproductions are legible.

6. Organize Submittal files individually by specification section with file name format as Follows; "*CSISection# - Section Title* - any further identifier required such as *control drawings*"

7. Send an email to submittal@nbpengineers.com with a copy to the HVAC Design Professional and any Architectural Design Professional identified during the preconstruction phase.

8. Identify the submittal using the official project title, specification section and submitted item. i.e. Project No. G-xxx, Addition to Administrative Building-Section 230548-Vibration and Seismic Controls. Include drawing or detail number, room number, date, revision date(s), contractor and subcontractor's organization as applicable

9. Include the project manager's and manufacturers' representatives, salesman's (or a preparer who can answer questions) contact information, email and phone number.

10. Identify the submittal in the email subject line using the same information listed above.

11. Provide a submittal index.

12. Ensure any submittal posted to NBP's or other FTP site has the same identification.

13. NBP Design Professionals will not process or react to submittals which are not properly transmitted, indexed, and identified.

D. Tabulation of Power Wiring Requirements: Within 60 Days of the Notice to Proceed, provide a Tabulation of Power Wiring Requirements of all proposed equipment, including H.P., amps, voltage, phase and KW, tabulated on a separate sheet. A copy of the tabulation shall be transmitted independently to the Contractor, the Design Professional and to all affected trades. (Refer to Electrical Drawings for electrical provisions for equipment.)

E. Warranty: Submit the HVAC installer's warranty letter addressed to the Owner stating the correct project name and number, if applicable, the warranty period and ensure that form has the correct date of the Material Completion.

1.6 OPERATING AND MAINTENANCE MANUALS

A. Operating and Maintenance Manuals shall be prepared by the Contractor for all equipment and be submitted for review a minimum of prior to the request for Material Completion.

B. Digital delivery of Operating and Maintenance Manuals:

1. Operating and Maintenance Manuals may be delivered digitally and posted to the NBP Engineers FTP site when agreed upon by the Design Professional and the Owner during the preconstruction phase. The Contractor will be provided with a project folder and password.

2. Prepare the Operating and Maintenance Manuals as described above. Take steps to reduce submittal file size.

3. Do not scan in color or high resolution unless required for clarity.

4. Ensure any reproductions are legible.

5. Send an email to submittal@nbpengineers.com with a copy to the HVAC Design Professional and the Architectural Design Professional identified during the preconstruction phase.

6. Identify the manuals in the email subject line using the official project title, specification section and submitted item. I.E. Project No. G-xxx, Addition to Administrative Building.

7. Table of Contents(Index) sheets shall be included in the order listed with identifications typed in capital letters.

8. Ensure the manuals posted to the FTP site has the same identification.

9. NBP Design Professionals will not process or react to manuals which are not properly transmitted, indexed, and identified.

C. Each Manual shall contain the following information, data and drawings:

1. Copies of submittals (with Design Professional's review comments and stamp), equipment and materials.

2. Manufacturer's installation, operating and maintenance instructions for each item of equipment with moving parts including recommended frequency of inspections and maintenance for one year of facility operation.

3. Manufacturer's list of renewal parts for each item of equipment with recommended stock items and quantities indicated.

4. Control diagrams, electrical interlock diagrams, and control valve lists.

5. Copies of as-built shop drawings showing layouts and construction details.

6. Copies of Test and Balance Reports including list of instruments and description of methods employed.

1.7 QUALITY ASSURANCE

A. HVAC Installer Qualifications:

1. Wherever the word "company" or "firm" is used in these subparagraphs, it shall mean the contractor/subcontractor of record for the installations used for proficiency qualification.

2. Refer to the individual sections within this division for additional installer qualification requirements.

3. The Contractor expressly warrants that the company performing the installation of the air conditioning systems has demonstrated proficiency in the installation, start-up and adjustment of such systems by the successful performance of work of the nature specified herein on at least three commercial or institutional buildings, each containing minimum of 200 tons capacity or greater with ducted air distribution and chilled water, PTAC or wall hung units excluded.

4. The Contractor further warrants that the aforesaid subcontractor, if any, has trained personnel, instruments, tools, and equipment to perform the installation, start-up, instruction and maintenance service specified.

5. The Contractor also warrants that the aforesaid installer, if any, has been in business performing services of the nature specified herein for at least five years.

B. Testing and Balancing Qualifications: Refer to Section 23 0593.

1.8 WARRANTY

A. Refer to Section 01 7000 - Contract Closeout, for additional warranty requirements.

B. Submit manufacturers' warranties prior to final inspection. Refer to the General Conditions.

C. Correct any defective Work within a one year period after Date of Material Completion. Provide HVAC Installer's warranty letter dated the date of the Material Completion

D. Where warranties beyond the Contractor's one (1) year warranty are specified, the additional warranty time shall start on the same date as the Contractor's warranty.

PART 2 PRODUCTS -NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

A. Refer to the specifications and Architectural and Structural drawings for additional requirements pertaining to work under this discipline. Notify the Design Professional for clarification in the event of conflict.

B. All materials of systems installation exposed in hollow spaces that are used as ducts or plenums shall have a flame spread rating of 25 or less and a smoke development rating of 50 or less.

3.2 PREPARATION

A. Drawings are diagrammatic and show the general proximity of the equipment, ducts, and pipes, etc., are not to be scaled, and do not include all required changes in direction or offsets necessary in coordinating the installation of various materials either between trades or within the same trade. All dimensions shall be verified at the building site. Prefabrication and/or installation of work from drawings shall be at the Contractor's risk. Refer to Architectural plans for exact building dimensions and details.

B. Space Conditions:

1. All apparatus shall fit into the available spaces in the building and must be introduced into the building so as not to cause damage to the structure. Equipment larger than access to equipment spaces shall be disassembled into sub-assemblies for installation.

2. Where deviations from the plans are required in order to conform to the space limitations, such changes shall be made at no additional cost to the Owner and shall be subject to approval.

3. All equipment requiring service shall be made accessible. Coordinate piping and ductwork installation to avoid conflict with other trades.

3.3 INSTALLATION

A. Clearance above and in front of electrical switchgear, electrical power panels or control panels shall be maintained by mechanical systems so that no mechanical ducts, pipes, vents or

equipment is routed above or across the space directly above this equipment in conformance with the National Electrical Code.

B. All equipment shall be installed in accordance with manufacturers' published installation instructions shipped with the equipment. In the event there is a discrepancy between these specifications or Drawings and the manufacturers' instructions, no work shall be performed until additional instructions are received.

C. Install and connect all appliances, equipment, and appurtenances as specified, indicated or required in accordance with the manufacturer's instructions and recommendations. Furnish and install complete auxiliary piping, water seals, valves, electric connections, and similar items, recommended by the manufacturer or as required for proper operation.

D. Equipment, valves and other items installed under this division requiring service shall be installed to be readily accessible. Refer to definitions in this section.

E. Coordinate with the Contractor and monitor the progress of the work so that other trades do not obstruct items requiring access for service.

F. After final balancing, equipment with belt drives shall have their belts operating in the mid-80% position of the adjustable sheave.

G. Provide equipment belt and coupling guards shielding the perimeter and face of all new belt drives, shafts and couplings. Provide openings opposite drive and driven shafts to permit use of revolution counter. Guards for fans shall be supported from the fan and mounting base, independent of the floor or housekeeping pad.

H. Route piping and ductwork to avoid skylights, translucent, and transparent ceilings.

I. Seal sleeves and openings in exterior walls vaportight or watertight as applicable.

J. Equipment and pipe support upper attachments shall be 3" x 3" x 1/4" steel angles, minimum, spanning structural members unless noted otherwise. Provide inserts and bolts for supporting pipes and equipment from structural members.

K. Saw cut or core drill openings in existing work for the installation of the mechanical system. Patching shall be performed by the trade whose work is cut. Contractor shall lay out and install his work ahead of the work of other trades wherever possible.

3.4 SPACE CONDITIONING DURING CONSTRUCTION

A. Coordinate with the Contractor regarding the limits of space conditions specified or requested by other trade sections.

B. Assist the Contractor in the preparation of the construction schedule and determine to what extent the project's HVAC system can be operated within the restrictions listed below to help maintain those conditions.

C. Ducted air handling systems shall not be placed into operation for testing or for temporary space conditioning until all walls in areas served by the system have been prepared for painting and the building is broom clean.

D. The building's HVAC system shall be kept clean during the entire construction process. Protect equipment, motor, ducts, pipes from dirt and debris.

E. Filters during construction:

1. Provide and maintain filters on all air handling equipment and terminal units used for space conditioning during construction.

2. Provide and maintain filters on all return air grilles once ceilings are installed when air handling equipment or terminal units are used for space conditioning during construction.

3. Provide filters with a minimum MERV rating of 8.

F. Heating Terminal units such as unit heaters, cabinet heaters and finned radiation may be used for temporary heat during construction. Clean to new condition.

3.5 STARTING EQUIPMENT AND SYSTEMS

A. Adjust equipment for proper operation within manufacturers' published tolerances.

B. Demonstrate proper operation of systems and equipment to the Owner 's designated representative.

3.6 DEMONSTRATION, TRAINING AND INSTRUCTIONS

A. A manufacturer's service representative shall provide the instructions for each piece of equipment on system when specified in other Sections of this Division. A manufacturer's sales representative is not acceptable. (The instructor shall not be a sales person, but shall have service experience on a continuing basis and be knowledgeable about the subject equipment.)

3.7 CLEANING AND PROTECTION

A. All materials, equipment and mechanical rooms shall be cleaned prior to Material Completion.

B. Wash down and scrub clean all mechanical room floors, walls, equipment bases and equipment.

C. Paint equipment where finish has been damaged requiring retouching of finish to match factory finish.

D. All air handling equipment shall be cleaned internally prior to Material Completion. Clean unit casing externally and internally. Seal/replace all damaged duct liner.

E. Chipped or scraped paint shall be retouched to match original finish.

F. Clean and polish all equipment nameplates. All nameplate information shall be legible.

G. All dents and sags in ductwork and equipment casings shall be straightened.

H. All ductwork, insulation, equipment, pipe, pipe fittings and appurtenances shall be free of dust, rust and stains prior to Material Completion.

3.8 FINISHING EQUIPMENT AND MATERIAL

A. Use paint systems specified in Division 9 for the substrates to be finished.

B. Paint shop-primed equipment.

C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

D. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

E. All ferrous fasteners and hanger supports not having a corrosion resistant plated finish shall be painted to prevent rust.

F. Paint all exposed un-insulated ferrous metals, flat black.

G. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.

H. Concrete Equipment pads: Clean concrete and paint pad safety yellow.

END OF SECTION

SECTION 23 0513

MOTORS FOR HVAC EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single phase electric motors.

1.2 RELATED REQUIREMENTS

A. Section 26 2717 - Equipment Wiring: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

A. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2014.

B. NFPA 70 - National Electrical Code, 2014 Edition; National Fire Protection Association.

1.4 QUALITY ASSURANCE

A. Conform to NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Baldor,Century,Lincoln,Marathon,Magnetec,Toshiba

2.2 GENERAL CONSTRUCTION AND REQUIREMENTS

A. Electrical Service:

1. Motors 1/2 HP and Smaller: 115 volts, single phase, 60 Hz.

2. Refer to Electrical drawings for voltage and phase required.

B. Overload Protection: Single phase motors shall be furnished with built-in automatic reset overload protection.

C. Brake Horsepower: All motors shall have rated horsepower at least 10 percent above the indicated brake horsepower of equipment including belt losses and inlet vane losses.

D. Construction:

1. Open drip-proof type except where specifically noted otherwise.

2. Design for continuous operation in 40 degrees C environment.

3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.

4. All copper windings and leads.

5. Motors for belt driven equipment and base mounted pumps shall have cast iron yoke and bearing housings.

E. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.

F. Wiring Terminations:

1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.

2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.3 APPLICATIONS

A. Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not conform to these specifications.

B. Single phase motors for shaft mounted fans or blowers: Permanent split capacitor type.

C. Single phase motors for fans: Capacitor start, capacitor run type.

2.4 SINGLE PHASE POWER - PERMANENT-SPLIT CAPACITOR MOTORS

A. Starting Torque: Exceeding one fourth of full load torque.

B. Starting Current: Up to six times full load current.

C. Multiple Speed: Through tapped windings.

D. Open Drip-proof or Enclosed Air Over Enclosure: Class A (50 degrees C temperature rise) insulation, minimum 1.0 Service Factor, prelubricated sleeve or ball bearings, automatic reset overload protector.

2.5 SINGLE PHASE POWER - CAPACITOR START MOTORS

A. Starting Torque: Three times full load torque.

B. Starting Current: Less than five times full load current.

C. Pull-up Torque: Up to 350 percent of full load torque.

D. Breakdown Torque: Approximately 250 percent of full load torque.

E. Motors: Capacitor in series with starting winding; provide capacitor-start/capacitor-run motors with two capacitors in parallel with run capacitor remaining in circuit at operating speeds.

F. Drip-proof Enclosure: Class A (50 degrees C temperature rise) insulation, NEMA Service Factor, prelubricated sleeve bearings.

G. Enclosed Motors: Class A (50 degrees C temperature rise) insulation, 1.0 Service Factor, prelubricated ball bearings.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

SECTION 23 0548

VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Vibration isolators.

1.2 REFERENCE STANDARDS

A. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2011.

1.3 SUBMITTALS

A. Refer to Section 23 0510 - General HVAC Requirements, for submittal procedures.

B. Product Data:

1. Provide manufacturer's product literature documenting compliance with PART 2 PRODUCTS.

C. Shop Drawings:

1. Provide schedule of vibration isolator type with location and load on each.

D. Manufacturer's Instructions: Indicate installation instructions with special procedures and setting dimensions.

1.4 QUALITY ASSURANCE

A. Perform design and installation in accordance with applicable codes.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Amber Booth: www.amberbooth.com.

B. Isolation Technology, Inc.: www.isolationtech.com

C. Kinetics Noise Control, Inc.: www.kineticsnoise.com.

D. Korfund Dynamics: www.thevmcgroup.com.

E. Mason Industries: www.mason-ind.com.

F. Vibration Eliminator Company, Inc.; www.veco-nyc.com.

G. Vibration Mounting and Control: www.vmc-kdc.com.

H. Vibro-Acoustics: http://www.vibro-acoustics.com.

2.2 PERFORMANCE REQUIREMENTS

A. General:

1. All vibration isolators, base frames and inertia bases to conform to all uniform deflection and stability requirements under all operating loads.

2. Steel springs to function without undue stress or overloading.

2.3 VIBRATION ISOLATORS

A. Non-Seismic Type:

1. Neoprene Rubber Mount or Hanger: Molded rubber designed for 0.4 inch deflection with threaded insert.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's instructions.

B. Vibration isolation hangers shall be positioned as close as possible to the structure without coming in contact with any object (including the structure).

1. Hanger rods shall not contact any object which would short circuit the isolator.

3.2 SCHEDULE

A. Equipment Isolation Schedule.

1. Suspended fans:

a. Isolator Type: Rubber Mount or Hanger.

b. Isolator Deflection:.75 inches.

END OF SECTION

SECTION 23 0553

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

PART 2 PRODUCTS

2.1 NAMEPLATES

A. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

B. Size: 1/2 inch high letters unless otherwise noted.

C. Size when located on ceiling grid: 3/8 inch high letters unless otherwise noted.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Identify wall hung heat pump units, PTAC units, fans, and electric heaters with plastic nameplates.

END OF SECTION

SECTION 23 0593

TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Initial testing, adjustment, and balancing of air systems.

B. Measurement of final operating condition of HVAC systems.

C. Testing of control sensors, controllers and safeties.

1.2 REFERENCE STANDARDS

A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.

B. NEBB (TAB) - Procedural Standard for Testing Adjusting and Balancing of Environmental Systems; National Environmental Balancing Bureau; 2005, Seventh Edition.

1.3 SUBMITTALS

A. Refer to Section 23 0510 - General HVAC Requirements for submittal procedures.

B. Submit name of adjusting and balancing agency for approval within 30 days after Notice to Proceed.

C. Initial Review: Submit results of testing and balancing agency's examination of documents and systems within 30 days after Notice to Proceed.

D. Initial Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

1. Submit under provisions of Section 01 4000.

2. Submit prior to the Contractor's Request for Material Completion.

3. Submit copies of report for review prior to final acceptance of Project. Provide final copies for the Design Professional and for inclusion in operating and maintenance manuals.

4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.

5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.

6. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

7. Test Reports: Indicate data on AABC MN-1 forms, forms prepared following ASHRAE Std 111, or NEBB forms.

8. Include the following on the title page of each report:

    a. Name of Testing, Adjusting, and Balancing Agency.

    b. Address of Testing, Adjusting, and Balancing Agency.

    c. Telephone number of Testing, Adjusting, and Balancing Agency.

    d. Project name.

    e. Project location.

    f. Project the Design Professional.

    g. Project Engineer.

    h. Project the Contractor.

    i. Report date.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:

    1. AABC MN-1, AABC National Standards for Total System Balance.

    2. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work and submit Report prior to the Final Observation of the project.

C. TAB Agency Qualifications:

    1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.

    2. Certified by one of the following:

        a. AABC, Associated Air Balance Council: www.aabchq.com; upon completion submit AABC National Performance Guaranty.

        b. NEBB, National Environmental Balancing Bureau: www.nebb.org.

    3. Company shall an independent firm with no relationship with any Contractor on this Project.

D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

E. Pre-Qualified TAB Agencies: Testing and Balancing shall be performed by one of the following firms:

1. Air Analysis of Atlanta.
2. Air Data - Macon, Inc.
3. Alpha Air Balance.
4. Atlanta Air Balance.
5. HVAC Testing Services, Inc.
6. TAB Services.
7. Thomas Balancing.

3.2 EXAMINATION

A. Review the contract documents and existing conditions for appurtenances and arrangement for balancing prior to the installation of any equipment or material. the Contractor shall notify the Design Professional of any omissions noted within 30 days of the Contractor's notice to proceed.

B. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. All filters are clean and in place. If required, install temporary media in addition to filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place, accessible, operable and open. Report observation on test report.
8. Smoke dampers are in place, damper and operator are accessible, damper is operable, and open. Report observation on test report.
9. All dampers and operators function smoothly from shut-off to full open.
10. Air coil fins are cleaned and combed.
11. Access doors are installed at specified components are accessible, are closed and duct end caps are in place.
12. Air outlets are installed and connected.

13. Duct system leakage is minimized.

3.3 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to the Design Professional to facilitate spot checks during testing.

B. Testing of equipment shall be simultaneous where components of a systems are connected; e.g. DX coil and condensing unit.

3.4 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 5 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

C. Building Pressure: Ensure that installation tolerances result in each floor of the building being positively pressurized with respect to outside ambient pressure.

3.5 RECORDING AND ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.6 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct. Close openings after measurement with permanent manufactured plugs.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds by drive sheave adjustment. Provide drive changes required to place belt in mid-position at final RPM. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including pressure drops at all components including filters and fans, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions. Adjust operators on outside air dampers to ensure tight seal when shut.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. The differential at the time of balance between the outside and return air streams shall be 15 degrees F, minimum, when the outside air quantities are established by temperature differential.

L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain positive building pressure near the building entries under all operational sequences.

3.7 CONTROL SYSTEM PROCEDURE

A. Sequence of Operation: Operate systems thru specified Sequence and confirm system function.

B. Thermostats, Input/Output sensors and Controls: Measure temperature or flow at device and record measurement and setting of controller.

3.8 SCOPE

A. Test, adjust, and balance the following:

1. Packaged Terminal Air Conditioning Units

2. Packaged Wall Mounted Heat Pump Units.

3. Terminal Heat Transfer Units

4. Fans, Powered Ventilators and Exhausters

5. Laboratory Airflow Control Systems

6. Air Inlets and Outlets

3.9 MINIMUM DATA TO BE REPORTED

A. Electric Motors:

1. Manufacturer
2. Model/Frame
3. HP/BHP
4. Phase, voltage, amperage; nameplate, actual, no load
5. RPM
6. Service factor
7. Starter size, rating, heater elements
8. Sheave Make/Size/Bore

B. V-Belt Drives:

1. Identification/location
2. Required driven RPM
3. Driven sheave, diameter and RPM
4. Belt, size and quantity
5. Motor sheave diameter and RPM
6. Center to center distance, maximum, minimum, and actual

C. Cooling Coils:

1. Identification/number
2. Location
3. Service
4. Manufacturer
5. Air flow, design and actual
6. Entering air DB temperature, design and actual
7. Entering air WB temperature, design and actual
8. Leaving air DB temperature, design and actual
9. Leaving air WB temperature, design and actual
10. Saturated suction temperature, design and actual
11. Air pressure drop, design and actual

D. Air Moving Equipment:

1. Location
2. Manufacturer
3. Model number
4. Serial number
5. Arrangement/Class/Discharge
6. Air flow, specified and actual
7. Return air flow, specified and actual
8. Outside air flow, specified and actual
9. Total static pressure (total external), specified and actual
10. Inlet pressure
11. Discharge pressure
12. Sheave Make/Size/Bore
13. Number of Belts/Make/Size
14. Fan RPM
15. Describe filter condition.
16. Plot actual fan operating point on fan curve chart.

E. Exhaust Fans:

1. Location
2. Manufacturer
3. Model number
4. Serial number
5. Air flow, specified and actual
6. Total static pressure (total external), specified and actual
7. Inlet pressure
8. Discharge pressure
9. Sheave Make/Size/Bore

10. Number of Belts/Make/Size
11. Fan RPM
12. Plot actual operating point on pump curve chart.

F. Duct Traverses:

1. System zone/branch
2. Duct size
3. Area
4. Design velocity
5. Design air flow
6. Test velocity
7. Test air flow
8. Duct static pressure
9. Air temperature
10. Air correction factor

G. Air Distribution Tests:

1. Air terminal number
2. Room number/location
3. Terminal type
4. Terminal size
5. Area factor
6. Design velocity
7. Design air flow
8. Test (final) velocity
9. Test (final) air flow
10. Percent of design air flow
11. Relative position of balancing damper

H. Space Temperature and Humidity:

1. Temperature and humidity (whether controlled or not) of each conditioned space

2. Setpoint of each controlling thermostat or humidity sensing device.

END OF SECTION

SECTION 23 0713

DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

1.2 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

B. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association 2007.

1.3 SUBMITTALS

A. Refer to Section 23 0510 - General HVAC Requirements, for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

1. CertainTeed Corporation: www.certainteed.com.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that ducts have been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Provide insulation with vapor barrier jackets.

D. Continue insulation through walls, sleeves, hangers, and other duct penetrations.

E. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, duct lined with duct liner, heating coil return bends at terminal units, and expansion joints.

F. Fiber Glass, Flexible:

1. Do not pull insulation tight around ducts.

2. Lap transverse joints 2 inch, minimum and secure with staples 18 inches on center.

3. Wrap insulation with Tie Wire 18 inches on center, maximum.

4. Install mechanical fasteners not more than 18 inches on center on ducts over 24 inches wide.

5. Provide 24 inch length, minimum, of rigid glass fiber insulation on bottom of ducts supported from trapeze hangers.

G. Weld mechanical fasteners to duct. No glue or stick on allowed.

H. Duct Accessories, Duct Mounted Meters and Gages Instruments and Duct Mounted Instrumentation and Other Control Devices:

1. In conditioned spaces devices shall be left exposed and/or accessible above the insulation vapor barrier jacket for access. Seal to vapor barrier jacket.

2. In non-conditioned spaces devices shall be insulated within the insulation vapor barrier jacket with the insulation and jacket arranged to provide access.

3. Accessible devices to include:

a. Duct mounted Instrumentation,

b. Airflow Measuring Station pressure ports,

c. Input/Output Sensors,

d. Duct access door handles,

e. Volume Control damper handles(MVD),

4. Damper operators shall be left exposed and/or accessible above the insulation vapor barrier jacket for access. Seal to vapor barrier jacket.

3.3 CLEANING

A. Clean adjacent surfaces, valves, valve handles, etc. of jacketing materials.

3.4 SCHEDULES

A. Exhaust Ducts Within 10 ft. of Exterior Openings/Termination:

1. Glass Fiber, Flexible; 2 inch thick.

END OF SECTION

SECTION 23 3100

HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal ductwork.

B. Flexible Ducts.

C. Ductwork Fabrication.

1.2 RELATED REQUIREMENTS

A. Section 23 0713 - DUCT INSULATION: External insulation and duct liner.

B. Section 23 3300 - AIR DUCT ACCESSORIES.

1.3 REFERENCE STANDARDS

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; 2013.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

E. SMACNA - Duct Cleanliness for New Construction Guidelines., 2000.

F. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.4 DEFINITIONS

A. Low Pressure Duct: Duct having Pressure Class of 2-inches or less.

B. Medium or High pressure Duct: Duct having Pressure Class over 2-inches.

1.5 SUBMITTALS

A. Refer to Section 23 0510 - General HVAC Requirements for submittal procedures.

B. Product Data: Provide data for:

1. Duct take-off fittings.

2. Manufactured metal ductwork and fittings.

3. Flexible ducts.

4. Transverse Duct Connection System.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of documented experience.

1.7 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

1.8 DELIVERY, STORAGE, AND PROTECTION(REFER TO DUCT CLEANLINESS LEVEL SPECIFIED IN INSTALLATION)

A. Store in clean dry place and protect from weather and construction traffic.

B. Exercise care during construction to prevent the accumulation of dust, dirt, and refuse in the supply and return ductwork.

C. All openings shall be tightly closed with 8-mil polyethylene when work creating dust and debris is in progress.

D. Exposed Spiral Duct in finished spaces:

1. Accept products on site in protective wrapping. Inspect for damage.

2. Protect surface and finish from damaged(dings), grease or other contaminants affecting duct finish.

3. "Nested" shipment for exposed duct shall not be acceptable.

PART 2 PRODUCTS

2.1 MATERIALS

A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G90/Z275 coating.

B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.

1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.

2. VOC Content: Not more than 250 g/L, excluding water.

3. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.

4. Manufacturers:

    a. Manufacturers (water based): Ductmate Proseal, Hardcast IronGrip 601, Marathon 460, Foster 32-19; Childers CP-146, DuroDyne SAS.

2.2 DUCTWORK FABRICATION

A. General:

1. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE Handbook - Fundamentals.

C. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

D. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.

E. All dimensions are net inside metal measurements in inches unless otherwise shown.

F. Duct sizes shown include allowance for liner thickness unless otherwise noted, except sizes shown for lined round spiral and flat oval duct are sizes of perforated inner liner

G. Exposed Duct:

1. Exposed duct in finished spaces shall be medium pressure Spiral duct and fittings.

2. Exposed duct finish shall be mill phosphatized for field painting.

3. Provide segmented standing seam elbows on exposed duct in finished spaces.

H. Transverse Duct Connection System: SMACNA "E" rated rigidly class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips.

I. Low Pressure Duct- Exhaust (2" Class or less):

1. Longitudinal Seams:

    a. Corner Seams: Fig. 2-2, Type L1 (Pittsburgh Lock).

        1) Corner seams for ducts less than 18 inch, L-2 (Button Punch Snap Lock) is acceptable.

    b. Fig. 2-2, Type L-3 for seams other than corner.

2. Transitions:

    a. Changes in duct sizes shall be made by transitions.

    b. Refer to Fig. 4-7, CONCENTRIC TRANSITION, unless otherwise noted.

c. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

d. Transitions shall be provided between equipment and duct where sizes are not the same.

3. Rectangular Duct:

a. Elbows:

1) Mitered with turning vanes. Type RE 2, Figure 4-2, unless otherwise noted.

b. Turning Vanes:

1) Turning vanes shall be in accordance with Figs 4-3 and 4-4, unless otherwise noted.

2) Provide single wall vanes for ducts 18" width or less.

3) Provide double wall vanes for ducts over 18" width.

c. Splits and Tees:

1) Fig. 4-5, Type 1, Type 2 (with stationary splitter), 4A, or 4B only.

2) Use of Square Throat Elbow with Turning Vanes is acceptable, unless otherwise noted.

(a) Provide volume control damper in each branch.

3) Omit volume control damper in Return and Exhaust duct unless otherwise noted.

d. Where acoustical lining is indicated, provide acoustical turning vanes of perforated metal with glass fiber insulation.

4. Round Duct - Manufactured Spiral Duct:

a. Elbows: Radius elbow with radius not less than 1-1/2 times width of duct on centerline.

5. Branch and Runout Connections:

a. Entry fittings for Return and Exhaust: Construct for a 45 degree entry angle to ease the turbulence created by converging airstreams. Increase the minimum length shown in Fig. 4-6, 45 DEGREE ENTRY, from 4 inch to 6 inch.

b. Rectangular Branch or Runout from Rectangular Duct:

1) Fig. 4-6, 45 DEGREE ENTRY, with flange and gasket for connection to trunk with a minimum of six screws.

c. Round Branch or Runout from Rectangular Duct:

1) Fig. 4-6, 45 DEGREE LEAD IN, with flange and gasket for connection to trunk with a minimum of six screws.

2) Provide volume control damper with locking quadrant at branch or runout connection.

d. Round Branch or Runout from Round Duct:

1) Fig. 3-5, 90 DEGREE tee fitting with 45 DEGREE oval to round tap, unless otherwise noted.

2) Fig. 3-6, CONICAL TEE fitting.

e. Rectangular Runout to Sidewall Grille/Register:

1) Fig. 4-6, 45 DEGREE ENTRY, with flange and gasket for connection to trunk with a minimum of six screws.

6. Offsets: Fig. 4-7, Type 1 and Type 3 only, unless otherwise indicated.

7. Dampers: Fig. 7-4, SINGLE BLADE TYPE, or 7-5, MULTIBLADE TYPE.

8. Reinforcement:

a. Fabricate ducts in clearance critical areas such as chases and above ceilings to unreinforced standards, Fig. 2-8.

1) Tie Rod Reinforcement is acceptable in Supply, Return, and Exhaust duct only.

2) No screw or rivets are allowed to penetrate ducts.

J. Ducts Connecting to Wall Louvers:

1. Provide sheet metal plenum sealing louver area and connecting duct.

2. Fabricate in accordance with Fig. 6-1.

3. Fabricate plenum using same material and pressure class as connecting duct.

4. Paint exterior side of plenum flat black.

2.3 MANUFACTURED DUCTWORK AND FITTINGS

A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Flexible Ducts: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire.

1. Insulation: Fiberglass insulation with polyethylene vapor barrier film.

2. Insulation thickness shall be 1 inch thick, minimum; 3/4 lbs./cu ft., minimum.

3. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.

4. Maximum Velocity: 4000 fpm.

5. Temperature Range: Minus 20 degrees F to 210 degrees F.

6. Manufacturers:

a. Atco Rubber Products, Inc.; Model UPC-037: www.atcoflex.com.

b. Flexible Technologies Group-Thermaflex, Inc.; Model M-KE: www.thermaflex.net

c. Flexmaster USA; Model Type 3M: www.flexmasterusa.com.

d. Wiremold, Inc.; Model WK: www.wiremold.com.

C. Transverse Duct Connection System: SMACNA "E" rated rigidly class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).

PART 3 EXECUTION

3.1 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

C. Duct sizes for runouts to grilles, registers and diffusers shall match the size of the device unless otherwise noted.

D. Duct Cleanliness level: Advanced Level in accordance with SMACNA Duct Cleanliness for New Construction Guidelines.

E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

F. Use double nuts and lock washers on threaded rod supports.

G. Seal all transverse and longitudinal joints in all metal supply, exhaust and return ducts.

3.2 SCHEDULES

A. Ductwork Material:

1. General Exhaust: Galvanized Steel.

B. Ductwork Pressure Class:

1. General Exhaust: 2 inch negative.

END OF SECTION

SECTION 23 3300

AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Volume control dampers.

1.2 RELATED REQUIREMENTS

A. Section 23 3100 - HVAC DUCTS AND CASINGS.

1.3 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2012.

B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

1.4 SUBMITTALS

A. Refer to Section 23 0510 - General HVAC Requirements for submittal procedures.

B. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.

PART 2 PRODUCTS

2.1 VOLUME CONTROL DAMPERS (MVD).

A. Manufacturer: Ruskin MD35.

B. Other acceptable manufacturers offering equivalent products: Airstream, Arrow, Greenheck, Nailor Industries, National Controlled Air, Prefco, Pottorff.

C. Single Blade Dampers: Figure 7-4. Fabricate for duct sizes up to 6 x 30 inch.

D. Multi-Blade Damper: Figure 7-5. Fabricate of opposed blade pattern with maximum blade sizes 8 x 48 inch long. Assemble center and edge crimped blades in galvanized channel frame with suitable hardware; 16 gauge, minimum, steel channel frame with blade stops top and bottom; 16 gauge steel blades with formed edge groove to have 3/8 inch interlock between adjacent blades, with 1/2 inch diameter cadmium plated shaft extended 6 inches beyond frame and blade linkage.

E. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

F. Quadrants:

1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.

2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.

B. Volume Control Dampers:

1. Install where shown on drawings or required by details.

2. Lock all volume control dampers in the full open position for adjustment by the TAB agency.

END OF SECTION

SECTION 23 3700

AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Registers/grilles

B. Louvers

1.2 SUBMITTALS

A. Refer to Section 23 0510 - General HVAC Requirements for submittal procedures.

B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

PART 2 PRODUCTS

2.1 CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES (CGC)

A. Manufacturer: Titus Model 50F

B. Other acceptable manufacturers offering equivalent products:

1. Anemostat GC5
2. Carnes RAPAF
3. Price 80
4. Krueger RA
5. Nailor 51EC.
6. MetalAire CC5
7. Tuttle & Bailey CRE500

C. Type: Fixed grilles of 1/2 x 1/2 x 1/2 inch eggcrate grid core.

D. Fabrication: Aluminum with factory off-white enamel finish.

E. Frame: 1-1/4 inch margin with countersunk screw mounting.

F. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.2 WALL SUPPLY REGISTERS/GRILLES- HEAVY DUTY(WSAR-HD):

A. Manufacturer: Titus Model 300RL-HD.

B. Other acceptable manufacturers offering equivalent products:

1. Anemostat.

2. Carnes.

3. Price.

4. Krueger 620/F/D.

5. MetalAire V4004S-AF.

6. Tuttle & Bailey T647.

C. Type: Streamlined and individually adjustable blades, 1/2 inch minimum depth, 1/2 inch maximum spacing with spring or other device to set blades, horizontal face, double deflection.

D. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.

E. Fabrication: Steel with 18 gage minimum frames and 14 gage minimum blades with factory baked enamel finish, color to be selected.

F. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

2.3 WALL EXHAUST AND RETURN REGISTERS/GRILLES-HEAVY DUTY(WRAG-HD)

A. Manufacturer: Titus Model 33RL.

B. Other acceptable manufacturers offering equivalent products:

1. Anemostat EHDD.

2. Carnes RSHA.

3. Price GG95L.

4. Krueger S-480-H.

5. MetalAire - 4500.

6. Tuttle & Bailey RUD.

C. Type: 14 gauge streamlined blades, 3/4 inch minimum depth, 1/2 inch maximum spacing, with 0 degree fixed blade deflection, horizontal face.

D. Frame: 16 gauge 1-1/4 inch margin with countersunk screw mounting.

E. Fabrication: Steel frames and blades, with factory finish.

F. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.4 LOUVERS-ALUMINUM-DRAINABLE BLADE STYLE

A. Manufacturer: Ruskin Model ELF-6375DX.

B. Other acceptable manufacturers offering equivalent products:

1. American Warming & Ventilating LE-33.

2. Air Balance.

3. Arrow EA-615-D.

4. Dowco DW-6.

5. Greenheck ESD-603.

6. Industrial Louvers 653.

7. Louvers & Dampers IEL-6.

8. Shipman LE-33.

9. Tuttle & Bailey DB-645.

C. Type: 6 inch deep with blades on 45 degree slope, drainable blade with gutter, heavy channel frame, 19 gauge birdscreen with 1/2 inch square mesh for exhaust and 3/4 inch for intake.

D. Fabrication: 12 gage thick extruded aluminum, welded assembly, with factory baked enamel finish color to be selected.

E. Mullions: Provide hidden or exposed mullions to support blades as shown on architectural elevations.

F. Mounting: Furnish with masonry strap anchors for installation.

G. Insulated Blank-Off Panels:

1. Fabricate louver blank-off panels of materials and sizes indicated and to comply with the following requirements:

a. Finish: Match finish applied to louver with respect to coating type, except for color, which shall be flat black.

b. Attach blank-off panels to back of louver frames with stainless-steel sheet-metal screws.

2. Blank-Off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with metal sheets, complying with the following requirements:

a. Thickness: 2 inches (50 mm).

b. Metal Facing Sheets: Aluminum sheet, 0.032 inch (0.81 mm) thick.

c. Insulating Core: Unfaced, rigid, glass-fiberboard insulation complying with ASTM C612, Class 1 and Class 2.

d. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames 0.081 inch (2.06 mm) thick, with corners mitered and with same finish as panels.

e. Seal perimeter joints between panel faces and louver frames with 1/8 inch by 1 inch (3.2 mm by 25 mm) polyvinyl chloride compression gaskets.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

D. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9123.

3.2 AIR OUTLET AND INLET SCHEDULE

A. Refer to Schedule on Drawings.

END OF SECTION

SECTION 23 4000

HVAC AIR CLEANING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Disposable panel filters.

1.2 RELATED SECTIONS

A. Section 23 0510 - General HVAC Requirements - Space Conditioning during construction and building flushout.

B. Section 23 0519 - Gages and Meters - Filter Gages.

1.3 REFERENCE STANDARDS

A. UL 900 - Standard for Air Filter Units; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. Refer to Section 23 0510 - General Mechanical Requirements for submittal procedures.

B. Product Data: Provide data on filter media, filter performance data, filter assembly and filter frames, dimensions, motor locations and electrical characteristics and connection requirements.

C. Maintenance Materials: Furnish the following for the Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Provide filters whenever any system is operated during construction. Refer to Section 23 0510.

3. For every system requiring fitters;

a. Provide and install one set of new disposable panel filters at Material Completion.

b. Provide one set of spare disposable panel filters at Material Completion.

PART 2 PRODUCTS

2.1 DISPOSABLE PANEL FILTERS

A. Media: UL 900 Class 2, fiber blanket, factory sprayed with flameproof, non-drip, non-volatile adhesive.

1. Nominal Size: 12 x 24 inches.

2. Thickness: 1 inch.

B. Performance Rating:

1. Face Velocity: 500 FPM.

2. Initial Resistance: 0.15 inch WG.

3. Recommended Final Resistance: 0.50 inches WG.

C. Casing: Cardboard frame.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install air cleaning devices in accordance with manufacturer's instructions.

B. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.

C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with clean set.

END OF SECTION

SECTION 23 8127

SMALL SPLIT-SYSTEM HEATING AND COOLING

PART 1 PRODUCTS

1.01 MANUFACTURERS

A. Carrier Corporation : www.carrier.com.

B. Trane Inc. : www.trane.com.

C. York International Corporation / Johnson Controls : www.york.com.

1.02 SYSTEM DESIGN

A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.

1. Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator ; auxiliary electric heat.

2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.

B. Performance Requirements: See Drawings for additional requirements.

C. Electrical Characteristics:

1. Disconnect Switch: Factory mount disconnect switch on equipment under provisions of Section 26 2717.

1.03 INDOOR UNITS FOR DUCTED SYSTEMS

A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating and cooling element(s), controls, and accessories; wired for single power connection with control transformer.

1. Air Flow Configuration: Upflow.

2. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.

B. Supply Fan: Centrifugal type rubber mounted with direct or belt drive with adjustable variable pitch motor pulley.

1. Motor: NEMA MG 1; 1750 rpm single speed, permanently lubricated , hinge mounted.

2. Motor Electrical Characteristics:

C. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.

1. Construction and Ratings: In accordance with AHRI 210/240 and UL listed.

2. Manufacturers: System manufacturer.

1.04 OUTDOOR UNITS

A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.

1. Refrigerant: R-410A.

2. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23 and UL listed.

B. Air Cooled Condenser: ARI 520; Aluminum fin and copper tube coil, with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

C. Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gage ports, thermometer well (in liquid line).

1. Provide thermostatic expansion valves.

D. Operating Controls:

1. Control by room thermostat to maintain room temperature setting.

2. Low Ambient Kit: Provide refrigerant pressure switch to cycle condenser fan on when condenser refrigerant pressure is above 285 psig and off when pressure drops below 140 psig for operation to 0 degrees F.

1.05 ACCESSORY EQUIPMENT

A. Room Thermostat: Wall-mounted, electric solid state microcomputer based room thermostat with remote sensor to maintain temperature setting; low-voltage; with following features:

1. System selector switch (heat-off-cool) and fan control switch (auto-on).

2. Automatic switching from heating to cooling.

3. Preferential rate control to minimize overshoot and deviation from setpoint.

4. Short cycle protection.

5. Thermostat display:

a. Actual room temperature.

b. Programmed temperature.

c. System mode indication: heating, cooling, fan auto, off, and on, auto or on, off.

PART 2 EXECUTION

2.01 INSTALLATION

A. Install in accordance with NFPA 90A and NFPA 90B.

B. Provide full-size galvanized metal auxiliary drain pan with secondary drain. Route drain as indicated.

END OF SECTION

SECTION 26 0002

ELECTRICAL SPECIFICATIONS

1.1 26 0501 EXISTING CONDITIONS

A. The demolition plan (where shown) has been prepared to assist the Contractor in determining the scope of demolition work and should not be construed to be all of the demolition required. The Contractor shall visit job site (after carefully reviewing the contract documents) and determine exact areas and quantities of existing materials to be removed to accomplish new construction.

B. Notice of Outages: Notify the Architect and Owner, at least seven working days in advance, before partially or completely disabling a system. The Owner needs time to coordinate outages with the Owner's departments and personnel. If the Contractor requests outage with less advance notice, the Owner may assist the Contractor at the Owner's option.

C. Where existing circuits to remain are inadvertently damaged or disturbed, replace or repair the damaged portion of the circuit. The finished work shall conform to this specification for new work between remaining portions of the work around the removed work. Where circuit portions are removed by this work, reconnect circuits, re-route circuits, and provide circuit portions as required to maintain circuit continuity. Provide new conduit between remaining portions of the circuit. Provide new conductor of the same description between the first existing boxes, or provide boxes in accessible locations.

D. Conduit to be demolished shall be removed in its entirety from accessible locations. Inaccessible conduit shall be cut and plugged and the adjacent surface patched to match adjacent surface. Disconnect abandoned outlets and remove devices and circuiting. Remove abandoned outlets. In remaining walls, patch and finish the outlet to match the surrounding wall. Disconnect and remove electrical devices serving equipment that has been removed. Disconnect and remove abandoned luminaries. Remove brackets, stems, hangers, and other accessories.

E. Remove out-of-service communications cables including but not limited to telephone, computer, TV, antenna. Out-of-Service shall be defined as follows: Cables which have one or both ends disconnected from jacks or equipment. Cables which the Owner has tagged as "DEMOLISH", and the Owner has disconnected or cut the cable.

F. Hazardous Materials:

1. A/E's Responsibility: Plans and specifications have been prepared by the A/E for the Owner without the A/E having conducted investigation as to the presence of asbestos or hazardous waste on the project. Not being a part of this contract, the A/E has not charged any fees and has not and will not advise the Owner with regard to the detection and/or removal of asbestos or hazardous waste. The Owner is aware that asbestos or hazardous waste could be present and will make all decisions with regard to its removal. The removal of all hazardous materials and encapsulation of remaining surfaces is the sole responsibility of the Owner.

2. If the Contractor observes the existence of a friable material which must be disturbed during the course of his work, the Contractor shall promptly notify the Owner and the

Architect. The Owner shall make all arrangements regarding testing and removal or encapsulation of asbestos material if present. The Contractor shall not perform any work pertinent to the friable material prior to receipt of special instructions from the Owner through the Architect.

3. "Friable Material" is any material which can be crumbled, pulverized or reduced to a powder by hand pressure when dry.

1.2 26 0510 GENERAL ELECTRICAL REQUIREMENTS

A. General Items:

1. Drawings are diagrammatic and show the general location of the equipment, raceway, and equipment, but are not to be scaled. All dimensions shall be verified at the building site. Prefabrication and/or installation of work from drawings shall be at the Contractor's risk. Refer to Architectural plans and sections for exact building dimensions and details.

2. Provide housekeeping and equipment pads where penetrations occur through any slab in the electrical rooms. Any conduit that penetrates the slab and is exposed in the space shall be wrapped in a housekeeping pad. All electrical items that sit on the slab shall have housekeeping pads below. Rough up slab under bases before pouring concrete.

3. Where penetrations are made in fire rated partitions, walls, floors or ceilings during the course of electrical installation, these penetrations shall be restored to their intended fire ratings by the use of fittings or materials as approved by Underwriter's Laboratories for this purpose.

4. Instruct operating personnel designated by the Owner in operation and maintenance of the fire alarm system prior to the request for final inspection. A manufacturer's service representative shall provide the instructions (Instructor shall not be a sales person, but shall be one with service experience on a continuing basis, knowledgeable about the subject equipment.) The Owner will record (audio or video/audio) operating instructions given by the Contractor to the operating personnel.

5. Regulatory Requirements

a. Where requirements of these specifications exceed specified codes and ordinances, conform to these specifications.

b. Materials and equipment included in Underwriters Label Service shall bear that label. Electrical equipment shall be U.L. approved as installed.

c. Jurisdiction: Where codes or guides refer jurisdiction to local governing code officials, such official in this procedure shall be the State Fire Marshal.

d. Permits: Obtain all permits, paying all fees in connection therewith. At completion, have work inspected by proper authorities and furnish the Design Professional an inspection certificate showing approval of installation.

e. The Code currently adopted and presently in effect is the 2009 International Energy Conservation Code with all Georgia State Amendments.

f. Fire Prevention: Conform to 2012 International Fire Code with all Georgia State Amendments.

g. Building Code: Conform to the 2012 International Building Code with all Georgia State Amendments.

h. Electrical: Conform to the 2014 National Electrical Code (NEC), with any GA amendments, NFPA, and the National Electrical Safety Code.

i. Accessibility: Americans with Disability Act.

B. Submittals: Submit electrical items prior to purchase, for confirmation of acceptance. The purpose of submittals is to demonstrate that the Contractor understands the design concept of the project by indicating the equipment and materials he intends to furnish and install, and by detailing the installation he intends to achieve. The review by the Design Professional shall NOT be construed to be for the purpose of "approving" equipment or drawings. Items to submit (not all inclusive - see individual sections for additional requirements):

1. Submit a power wiring letter indicating coordination between the mechanical equipment to be purchased and the electrical breaker shown powering it. Failure to submit this letter will require the Contractor to assume responsibility for any required changes to the electrical design attributed to mechanical equipment. Include a copy of the Tabulated List of Power Wiring Requirements with the letter. The electrical requirements for the mechanical equipment is based on the best information available at the time of design.

2. Submit certificates for Fire Alarm System. Provide shop drawings prior to installation.

3. Operating and Maintenance manuals: at the end of the project provide a binder that contains shop drawings, wiring diagrams, as builts, warranty information and sign in sheets for all owner training sessions.

1.3 26 0519 LOW VOLTAGE POWER CONDUCTORS

A. Design Intent:

1. Provide copper conductors, THHN/THWN insulation.

2. All conductors shall be made in the USA.

3. Provide solid conductors for circuits #10 AWG and smaller, stranded for larger.

4. MC cable may not be used for any circuiting in this building.

5. Provide a dedicated neutral conductor for all branch circuits. THERE SHALL BE NO SHARED NEUTRAL CONDUCTORS.

B. Color Code:

1. 208Y/120 V, 3 Phase, 4 Wire System:

a. Phase A: Black.

b. Phase B: Red.

c. Phase C: Blue.

d. Neutral/Grounded: White.

2. Equipment Ground, All Systems: Green.

C. Submittal Requirements: NONE

1.4 26 0534 CONDUIT

A. Design Intent:

1. All conduit shall be made in the USA.

2. All new conduit must be painted to match the surrounding wall or ceiling color.

3. Use EMT conduit in dry spaces inside the building, 1/2" minimum unless the drawings indicate something larger. Where conflicting sizes are shown, install the larger size.

4. Transition to Rigid Metal Conduit for devices on the roof.

5. Liquid tite flex may be used where noted on the drawings.

6. Low voltage conduit shall be 1", except where noted otherwise on the drawings.

7. Low voltage conduit shall stub out of wall and continue out the corridor J hooks or cable tray, whichever is used per the drawings. See the conduit description on the drawing. Conduit shall stub out to the corridor J Hooks or Cable tray. Conduit stubs shall not stop inside the room, with J hooks to the corridor.

B. Installation:

1. Unless dimensioned, conduit routing indicated is diagrammatic.

2. When conduit destination is indicated and routing is not shown, determine exact routing required.

3. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.

4. Join EMT conduit together with set screw connectors.

5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.

6. Provide #16 galvanized pullwire or minimum 200 lb. polyolefin pull cord in each empty conduit except sleeves and nipples.

7. Install firestopping to preserve fire resistance rating of partitions and other elements.

C. Submittal Requirements: NONE

1.5 26 0537 BOXES

A. Design Intent: All boxes used in dry interior spaces shall be stamped metal type unless otherwise noted. Coordinate the size of the backbox required for the fire alarm devices with the manufacturer prior to purchase and rough in.

B. Installation:

1. Before stubbing outlets in an area, study the electrical drawings and architectural elevation views. Architectural elevation views shall govern outlet heights and orientation. Electrical drawings shall govern outlets quantity and approximate locations. Coordinate with the Architect for clarifications.

2. Where outlets are shown above cabinets and casework, the outlets shall be mounted with the bottom of the device plates one inch above the backsplash or counter trim, and horizontally aligned.

3. Typical backbox mounting heights include:

a. Receptacles: 18" AFF

b. Fire Alarm pull stations: 44" AFF

c. Fire Alarm Visual Strobe or Speaker: 83" or 6" below ceiling, whichever is lower. The strobe lens must not be lower than 80" AFF when installed. Coordinate this height with the windows in the classroom areas. See the plans for sections and detailed descriptions.

4. Boxes in fire rated walls: Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified. Where boxes are located in fire rated walls the wall opening area shall be limited as required by NFPA. Where box openings exceed NFPA limits provide a two hour fire rated barrier around the back and sides of boxes, inside the wall. Construct the barrier with two hour rated material of the board type joined with two hour fire rated material of the caulk type.

5. Use flush mounting outlet box in finished areas.

6. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.

7. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

1.6 26 0553 IDENTIFICATION OF ELECTRICAL SYSTEMS

A. Design Intent: Labeling circuits and panels is critical when renovating a space. There cannot be too much labeling.

B. Devices to be labelled include:

1. Panels, Transformers, Disconnects: Engraved type, white on black, indicating "Name" and "Fed by Panel-Circuit".

2. New panel directories will be required on any panel that any new work is performed. Where existing work is demolished, the breakers shall be labeled as "spare". If at any time an existing circuit has to be traced to find its origin and the device(s) that it serves; once this information is gathered, the circuit shall be clearly and permanently labeled in the existing panel and on the device in the method described by the detail on the sheet. New work indicated on the panel schedule shall be identified with the load and the room number.

C. Submittal Requirements: NONE

1.7 26 2416 PANELBOARDS

A. Description:

1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

2. Conductor Terminations: Aluminum, suitable for terminating aluminum or copper conductors.

3. Bussing: Aluminum

4. Circuit Breakers: Bolt on, thermal magnetic unless noted otherwise.

5. Enclosures: Provide surface-mounted or flush-mounted enclosures as indicated, and clear plastic circuit directory holder mounted on inside of door.

6. Load centers are not acceptable.

7. Manufacturers: Square D, Eaton, GE

B. Installation:

1. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

2. Housekeeping Pad: Provide 4 inch high, concrete housekeeping pad beneath each surface mounted panelboard. Pad shall extend one inch past panel perimeter on front and sides, with chamfered edge sized 1/2 inch to 3/4 inch. The concrete pad shall enclose all conduits feeding into the panelboard from the floor. This Pad is not required if there is no conduit from below.

3. Directory: Provide a typed circuit directory for each branch circuit panelboard. Directory serving lighting, outlets, or other items in spaces shall state an abbreviation of the type of load and the respective space numbers served.

C. Submittal Requirements: Submit panel data showing breaker arrangement, buss size and type, fault current capability, enclosure dimensions, and ground buss arrangement prior to purchase.

1.8 26 2726 WIRING DEVICES

A. Provide the following:

1. Wall Switches: 20A, Heavy Duty. IVORY in color.

2. Receptacles: NEMA 5-20, Heavy Duty. IVORY in color. GFI type where indicated. Provide a "while in use" cover for exterior receptacles at the outdoor air units.

3. Wall plates: Jumbo size, Brushed satin finish, Type 302 stainless steel.

B. Installation:

1. Provide GFI receptacles with integral GFI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.

2. Where two or more devices are shown adjacent, they shall be mounted in ganged boxes and covered with one faceplate.

C. Submittal Requirements: Provide submittal data indicating device model number and color prior to purchasing.

1.9 26 2818 ENCLOSED SAFETY SWITCHES

A. Design Intent: Provide Heavy Duty type with Externally operable handle interlocked to prevent opening front cover with switch in ON position. Provide fuses to match manufacturer’s instructions. Label as described in the drawings. Provide NEMA 1 rating indoor, NEMA 3R outdoor.

1.10 26 5100 INTERIOR LIGHTING

A. Design Intent: Furnish products as indicated on drawings and in specifications

B. Installation:

1. Wall mounted exit signs shall be mounted such that the bottom edge of the fixture is located a minimum of 7'6". Coordinate the location of the backbox with the ceiling and the top of the door frames. Locate the exit sign in the center of the space between the ceiling and the door frame where possible in areas where the ceiling is 12' and less. Areas where the ceiling is greater than 12' shall place the bottom of the exit sign at 7'6". Conditions on storefront at main lobby areas may require different heights. Coordinate with the architectural elevations prior to rough-in in finished spaces.

2. Grid Troffers: Provide two minimum 18 gauge galvanized steel hangar wires from diagonal corners of each fixture to structure.

C. Submittal Requirements: Submit fixtures for review prior to purchase.

1.11 26 5200 SENSOR LIGHTING CONTROL

A. Design Intent: The objective of this section is to ensure the proper installation of the occupancy sensor based lighting control system so that lighting is turned off automatically after reasonable time delay when a room or area is vacated by the last person to occupy said room or area. The occupancy sensor based lighting control shall accommodate all conditions of space utilization and all irregular work hours and habits. Where applicable, occupancy sensors shall be wired in a "Manual ON/ Auto OFF" configuration.

B. Installation:

1. The location of sensors shown on the plans are diagrammatic only. Locate sensors to avoid interference with possible obstructions.

2. Provide all power/switch packs required to make the system fully functional. Usually, a minimum of one power/switch pack is required per circuit and/or area of control. However in some cases additional power/switch packs may be required. Contact manufacturer for final determination of power/switch packs required for this project.

3. Wall switches shown in spaces with occupancy sensors shall be wired to override the sensor so that the lights can be switched off manually.

4. In spaces shown with multiple sensors, wire the sensors in parallel so that either sensor can control all of the fixtures on that circuit.

5. Mount ceiling type devices in the center of a ceiling tile.

C. Submittal Requirements: Submit sensors for review prior to purchase.

1.12 26 XXXX STRUCTURED CABLING FOR VOICE, DATA AND COAX - INSIDE PLANT

A. Design Intent - Voice/Data: Route BLUE CAT 6 plenum rated cable from the outlet shown back to the patch panel. Terminate both ends with RJ 45 connectors. Active equipment (handsets, hubs, switches, media converters, etc.) is not included in this contract unless otherwise noted.

B. Design Intent - Pathways: Utilize EMT conduit from the device backbox out of the wall up to above the accessible ceiling. Once above the ceiling, transition to:

1. J hooks in the style of a double 2.5" Arlington loop #TL25 RC14D.

C. Installer Qualifications:

1. The telecommunications installation contractor shall be licensed in the State of Georgia as a Low Voltage Licensed Telecommunications Contractor (LVLTC).

2. The selected LVLTC shall be fully capable and experienced in the telecommunications distribution system to be installed.

3. The LVLTC shall have a minimum of five (3) years of experience installing Structured Cabling Systems and be a certified installer of the approved cable/component system solution.

D. Labeling Horizontal Cables:

1. Permanently secure the label within 6 inches from both ends of the cable and at all pull boxes.

2. Label shall indicate patch panel and port to which the horizontal cable is terminated.

E. Testing - Copper Cabling and Associated Equipment:

1. Test backbone cables after termination but before cross-connection.

2. Category 6 Links: Perform tests for wire map, length, DC continuity, attenuation, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, and propagation delay.

3. Utilize a Level IIe tester for Category 6 link compliance. If any part of the installed system results in a "FAIL" indicator on the tester, the problem shall be analyzed and corrected.

4. Testers shall be correctly set to test the type and manufacturer of the horizontal cable used in the link being tested, including the correct NVP.

F. Submittal Requirements: Submit the cable test results.

1.13 26 6100 FIRE DETECTION AND ALARM

A. Design Intent: The contractor shall install all conduit and backboxes where shown on the plans and as needed to extend the existing fire alarm system to include new devices shown. Provide all components necessary, regardless of whether shown in the contract documents or not.

B. NOTE: All fire alarm conductors shall be installed in EMT conduit except that rigid metal conduit shall be used as required by the conduit section.

C. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business. In addition:

1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.

2. Installer Personnel: At least 2 years of experience installing fire alarm systems.

3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.

4. Contract maintenance office located within 50 miles of project site.

5. Certified in Georgia as fire alarm installer.

D. Operation:

1. The system alarm operation subsequent to the activation of any manual station or duct detector in the DOAC's shall be as follows:

a. All audible alarm indicating devices shall sound an alarm signal until silenced by the alarm silence switch at the control panel.

b. All visible alarm indicating devices shall flash continuously until the Alarm Silence Switch is operated.

c. Subsequent zone alarms shall reactivate the alarm indicating devices.

d. A supervised signal to notify the local fire department shall be activated from the Existing panel.

e. Supervised relays interlocked with mechanical controls shall initiate the air handling/ventilation sequence in accordance with NFPA 90 and as specified elsewhere in these specifications and as shown on the plans. Provide relays adjacent to starting/control devices in separate enclosure painted red.

E. Devices:

1. Initiating:

a. Manual Pull Stations:

1) Manual pull stations shall be addressable. Pull stations shall contain electronics that communicate the station's status (alarm, normal) to the transponder over two wires which also provide power to the pull station. The address shall be set on the station. The station shall mechanically latch upon operation and remain so until manually reset by opening with a key common to all system locks.

2) The addressable manual station shall be capable of field programming of its "address" location.

3) There shall be no limit to the number of stations, detectors or Zone Adapter modules, which may be activated or "in alarm" simultaneously.

b. Photoelectric Detector Head:

1) The photoelectric type detector shall be a plug-in unit which mounts to a twist-lock base, and shall be UL approved.

2) The detectors shall be of the solid state photoelectric type and shall contain no radioactive material. They will use a pulsed infrared LED light source and be sealed against rear air flow entry.

3) There shall be no limit to the number of detectors which may be activated or "in alarm" simultaneously.

2. Notification:

a. Notification Appliances:

1) Audible and/or Visual Units:

(a) Audible horn sound level shall be a minimum 90dBA at 10 feet.

(b) Provide speakers and amplifiers as required for voice evacuation where required. See plans for speaker locations.

(c) Any two visual strobes placed in the same field of view shall flash in synchronization. A new device adjacent to an existing device shall also be synchronized.

(d) Note: Strobe lenses may not be lower than 80" AFF. This does not mean the backbox may be at 80", as this would have the strobe lens below 80". Where indicated as "at 80"", this means the bottom of the LENS. Strobes may be located higher than 80" AFF if intensity of strobe is increased to the point that effective intensity is the same as a 75 candela strobe placed at 80" AFF. Wall mounted strobes shall still be located minimum 6 inches below ceiling. Contractor shall submit calculations from fire alarm vendor showing no change in effective intensity for strobes mounted higher than 80" AFF.

(e) Use minimum 75 candela intensity strobes. Strobes shall be xenon type or equivalent.

(f) Flash rate of strobe shall be in the 1 to 2 Hz. range.

(g) Maximum pulse duration of strobe shall be 0.2 seconds, with a maximum duty cycle of 40 percent.

F. Submittal Requirements:

1. Submit shop drawings for review prior to rough in.

2. NFPA 72 "Record of Completion", filled out to the extent known at the time.

3. System zone boundaries and interfaces to fire safety systems.

4. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.

5. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.

6. List of all devices on each signaling line circuit, with spare capacity indicated.

7. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.

8. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.

9. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.

10. Certification by the Contractor that the system design complies with the contract documents.

11. Training lesson plan outline.

END OF SECTION