



**GEORGIA INSTITUTE OF TECHNOLOGY
CHERRY EMERSON WEITZ RENOVATION**

Cherry Emerson Building
310 Ferst Drive
Atlanta, GA 30332

OWNER PROJECT NO: 0033-2022
ARCHITECT'S PROJECT NO: 2021064

**ISSUED FOR CONSTRUCTION
PROJECT MANUAL**

December 15, 2021

CONSULTANTS:

PHILLIPS-LANGLEY
Door Hardware

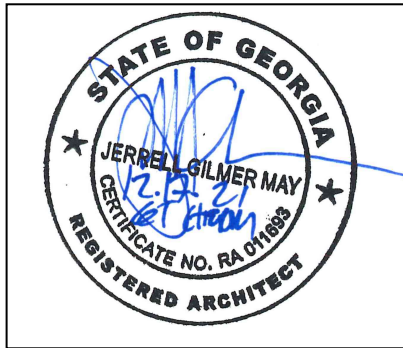


1175 PEACHTREE STREET NE, SUITE 1800
COLONY SQUARE BUILDING 100
ATLANTA, GEORGIA 30361 | 404-614-0700
WWW.MAYARCHITECTURE.COM

PROFESSIONAL SEALS

ARCHITECT

May Architecture + Interiors
1175 Peachtree Street NE, Suite 1820
Atlanta, GA 30361
404.614.0700



SECTION 00 0110

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SECTION 01 1000
SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Work shall comply with the Owner requirements including Georgia Tech Design and Construction current edition of the "Georgia Tech Yellow Book" design standards.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. Project consist of renovation of the Cherry Emerson Building on the Georgia Institute of Technology Campus. Scope of Work includes renovation of the Main Lobby, reconfiguration and finish upgrades to offices on Levels 1, 2, & 3 as well as Glass Storefront Walls on Level 2.

1.03 EXISTING CONDITIONS AND SPECIAL PROJECT CONDITIONS

- A. All reasonable efforts have been made by Owner's surveyor to locate and indicate various existing and proposed utilities and other conditions at the site. However, accuracy and completeness of this information is not guaranteed.
- B. Prior to beginning actual Work, thoroughly examine Project site, including access, storage, delivery facilities and all existing conditions that may affect Work. Inform Architect of discrepancies that affect completion of Work in compliance with Contract Documents.
- C. Replace or repair new and existing site improvements, utilities, streets and curbs which are damaged or disturbed incident to Work performed as part of Contract. Repair construction to be equivalent to or superior to quality and appearance of original construction.
- D. Coordinate work of all trades where work is concealed above finish ceilings, below finish floors or within walls, particularly where Contract Drawings are diagrammatic. Coordinate locations of piping, ductwork, conduit, lighting fixtures and similar items.
- E. Definitions:
 - 1. For purposes of this Contract reference herein to "Owner" shall mean "Owner or Owner's Project Manager".

1.04 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Coordinate use of premises under direction of Owner. Limit use of site for work and for storage to allow:
 - 1. Work by other Contractors.
 - 2. Space for Subcontractors' use.
 - 3. Owner's occupancy.

- C. Confine construction operations, including materials and equipment storage, project offices, storage buildings and other construction related operations and activities within designated areas.
 - 1. Contractor shall move materials, under his control, which interfere with work, when directed and at his expense.
 - 2. Obtain and pay for use of additional storage and work areas needed.
- D. Owner Use of Site: Owner specifically reserves right of entry to completed, and partially completed, areas for performance of other Work under Separate Contracts.
- E. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.05 NOTICE OF COMMENCEMENT

- A. Contractor is required to obtain, and post at the Project Site, a Notice of Commencement, in compliance with the Official Code to Georgia Annotated, Section 44-14-361.5.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 1000

SECTION 01 2500

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

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

1.03 SUBSTITUTION PROCEDURE

- A. Substitution Requests: Architect will consider formal requests from Contractor for product substitutions during pricing period and within 30 days after execution of Contract. Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of form provided in Project Manual.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - 3. Submit separate request for each substitution. Support request with the following:
 - a. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - b. Samples, where applicable or requested.
 - c. Certificates and qualification data, where applicable or requested.
 - d. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners, include date of each installation.
 - e. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.

- f. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - g. Data relating to changes in construction schedule.
 - h. List of changes required in other Work or products.
 - i. Designation of required license fees or royalties.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Itemized comparison of proposed substitution with product specified. List significant variations, including costs.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
4. Substitutions will not be considered if they are indicated or implied on Shop Drawings or Project Data submittals without a formal request from Contractor or when acceptance will require substantial revision of Contract Documents.

1.04 CONTRACTOR'S REPRESENTATION

- A. Contractor has personally investigated proposed product and has determined that it is equal or superior to that specified and that it shall perform the function for which it is intended.
- B. Contractor will provide same warranty, bonds and guarantee for substituted item as for product specified.
- C. Contractor will coordinate installation of approved substitution into Work, to include building modifications if necessary, making such changes as may be required for Work to be complete.
- D. Contractor certified cost data presented is complete and includes all related costs under this contract, excluding Architect's redesign fees.
- E. Contractor waives claims for additional costs related to substitution which subsequently become apparent.
- F. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.05 ARCHITECT'S DUTIES

- A. Review Contractor's request for substitution with reasonable timeliness.
- B. Notify Contractor of decision for acceptance of request for substitution.
- C. Architect reserves the right to require substitute items to comply in color and pattern with specified items to secure design intent.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 2500

SECTION 01 25 01
REQUEST FOR SUBSTITUTION FORM

TO:	<u>May Architecture</u>	FROM:	_____
	<u>1175 Peachtree Street NE</u>		name of company
	<u>Colony Square Building 100, Suite 1800</u>		_____
	<u>Atlanta, GA 30361</u>		street address
	<u>(404) 614-0700</u>		_____
Project:	_____		city and state
Project No:	<u>2021064</u>		_____
			contact name and phone number

Specification Title:	_____	Description:	_____
Section:	_____	Page:	_____
		Article/Paragraph:	_____

Proposed Substitution: _____

Manufacturer:	_____	Address:	_____
Phone:	_____		_____
Trade Name:	_____	Model No.:	_____

Installer:	_____	Address:	_____
Phone:	_____		_____
Description:	_____		

History: New Product 2-5 years old 5-10 years old More than 10 years old

Attach applicable performance and test data

Numbers of applicable reference standards _____

Attach a color chart, if applicable

Attach installation instructions.

Manufacturer's Reputation: Attach the following:

Evidence of reputation for prompt delivery.

Evidence of reputation for efficiency in servicing products.

Evidence of reputation for minimum five years' successful history.

Comparison: Attach an itemized comparison of the proposed substitution with product specified.

Previous Installation: Provide the following information on similar projects on which proposed substitution was used. Projects listed must have begun construction prior to the year 2016.

Project:	Address:	Date Installed:	Architect Name and Phone:
1			
2			
3			
4			
5			

Proposed substitution affects other parts of Work: Yes No

Please explain: _____

Schedule Data: Attach data relating to changes required in other work to permit use of proposed substitution and changes required in construction schedule.

Add _____ Deduct _____ days.

Cost Data: Attach accurate cost data on proposed substitution in comparison with product specified.

Savings to Owner for accepting substitution: _____ (\$ _____)

In making request for substitution, Contractor represents that:

- Contractor has examined the Drawings and Specifications, and has determined that, to the best of his knowledge, the proposed substitution is appropriate for the use intended in the Drawings and Specifications.
- Contractor will provide the same warranty for substitution as for product or method specified.
- Contractor will coordinate installation of accepted substitution into Work, making such changes as may be required for Work to be complete in all respects.
- Contractor waives all claims for additional costs related to substitution which consequently become apparent.
- Cost data is complete and includes all related costs under Contract.

 signature of Contractor

 date

 signature of subcontractor or materialman

 date

SECTION 01 2600

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

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

1.03 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on Board of Regents forms.

1.04 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms provided by Owner.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 2500 - Substitution Procedures if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.05 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on Board of Regents forms.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 2600

SECTION 01 2900
PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.03 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Sub schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange schedule of values consistent with format set forth in Application For Payment Forms in Section 7 of Board of Regents forms.
 3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.

4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
6. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.04 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Use Application for Payment or form provided in Section 7 of the Board of Regents forms.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's:
1. In compliance with Design Build Contract constitutional principles applicable to state public works projects designated as public property of the State of Georgia, and is not subject to levy or lien.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if not final).
 7. Initial progress report.
- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. Board of Regents forms in Section 7.
 5. Evidence that claims have been settled.
 6. Final meter readings for utilities and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 7. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 2900

SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 1. General coordination procedures.
 2. Coordination drawings.
 3. RFIs.
 4. Digital project management procedures.
 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.03 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.04 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in each built facility. Keep list current at all times.

1.05 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.

- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.

- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.

1.06 COORDINATION DRAWINGS

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

- a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 3. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 4. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 5. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 6. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 7. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.

8. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
 9. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 3300 - Submittal Procedures.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 2. File Submittal Format: Submit or post coordination drawing files using PDF format.
 3. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Digital Data Software Program: Drawings are available in CAD and PDF format.

1.07 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 - 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 - 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 - 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 2600 - Contract Modification Procedures.
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of web-based Project software. Software log with not less than the following:
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. Name and address of Architect.
 - 4. RFI number including RFIs that were returned without action or withdrawn.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's response was received.
 - 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 - 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.08 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Architect's Data Files Not Available: Architect will not provide Architect's CAD drawing digital data files for Contractor's use during construction.

- B. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 3. Digital Drawing Software Program: Contract Drawings are available in CAD and PDF.
 4. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Reflected ceiling plans.
- C. Web-Based Project Software: Use Architect's web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.
1. Web-based Project software site includes, at a minimum, the following features:
 - a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creating and distributing meeting minutes.
 - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - k. Management of construction progress photographs.
 - l. Mobile device compatibility, including smartphones and tablets.
 2. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.
 3. Provide the following web-based Project software packages under their current published licensing agreements:
 - a. Newforma, Inc.
- D. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare 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. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.09 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Sustainable design requirements.
 - o. Preparation of Record Documents.
 - p. Use of the premises and existing building.
 - q. Work restrictions.
 - r. Working hours.
 - s. Owner's occupancy requirements.
 - t. Responsibility for temporary facilities and controls.
 - u. Procedures for moisture and mold control.
 - v. Procedures for disruptions and shutdowns.
 - w. Construction waste management and recycling.
 - x. Parking availability.
 - y. Office, work, and storage areas.
 - z. Equipment deliveries and priorities.
 - aa. First aid.
 - bb. Security.
 - cc. Progress cleaning.
 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Progress Meetings: Conduct progress meetings at monthly intervals, unless otherwise determined by Owner and Architect; to maintain level of communication between all interested parties.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.
 - 4) Status of submittals.
 - 5) Status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFIs.
 - 16) Status of Proposal Requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 3100

SECTION 01 3233

PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 INFORMATIONAL SUBMITTALS (FIO)

- A. Digital Photographs: Submit image files within seven days of taking photographs.
 - 1. Digital Camera: Minimum sensor resolution of 8 megapixels.
 - 2. Format: Minimum 3200 by 2400 megapixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

PART 3 - EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.
 - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- C. Preconstruction Photographs: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Flag excavation areas before taking construction photographs.
 - 2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

- D. Additional Photographs: Architect may request photographs in addition to periodic photographs specified.
1. Three days' notice will be given, where feasible.
 2. In emergency situations, take additional photographs within 24 hours of request.
 3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site.
 - d. Substantial Completion of a major phase or component of the Work.

END OF SECTION 01 3233

SECTION 01 3300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

1.03 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals; "For Architect's Information Only" (FIO): Written and graphic information and physical samples that do not require Architect's responsive action and are required to demonstrate that Work complies with performance requirements of the Contract Documents. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.04 SUBMITTAL SCHEDULE

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

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

1.05 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
 1. Project name and location.
 2. Date and revision dates.
 3. Name of Architect.
 4. Name of Construction Manager.
 5. Name of Contractor.
 6. Name of firm or entity that prepared submittal.
 7. Names of subcontractor, manufacturer, and supplier.
 8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 9. Category and type of submittal.
 10. Submittal purpose and description.
 11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 12. Drawing number and detail references, as appropriate.
 13. Indication of full or partial submittal.
 14. Location(s) where product is to be installed, as appropriate.
 15. Other necessary identification.
 16. Remarks.
 17. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.06 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 1. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.

- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 10 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- D. 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.
- E. 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.
- F. 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.

1.07 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. BIM Incorporation: Develop and incorporate Shop Drawing files into BIM established for Project.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.

2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.08 CONTRACTOR'S REVIEW

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

B. Contractor's Approval: Indicate Contractor's approval for each submittal with indication in web-based Project software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Upon completion of review and prior to submission to Architect, hand letter, type or stamp each submittal with certification statement reading:

"I hereby certify this submittal data has been reviewed and approved prior to submission to Architect and the information contained within this submittal has been checked and coordinated with the requirements of the Work and the Contract Documents.

(Contractor's Name) _____

Signed _____

Position _____

Date _____"

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

1.09 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required and return it.
 1. Submittals by Web-Based Project Software: Architect will indicate, on Project software website, the appropriate action.
- B. Informational Submittals; (FIO): Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 3300

SECTION 01 3516

ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes special procedures for alteration work.

1.03 DEFINITIONS

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

1.04 COORDINATION

- A. Alteration Work Subschedule: A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.
1. Schedule construction operations in sequence required to obtain best Work results.
 2. Coordinate sequence of alteration work activities to accommodate the following:
 - a. Owner's continuing occupancy of portions of existing building.
 - b. Owner's partial occupancy of completed Work.
 - c. Other known work in progress.
 - d. Tests and inspections.
 3. Detail sequence of alteration work, with start and end dates.
 4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
 5. Use of elevator and stairs.
 6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use in existing structure. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.
- B. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within Project building(s) and site. Some work is near circulation patterns and adjacent to restricted areas. Insert item of concern. Circulation patterns cannot be closed off entirely and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

1.05 PROJECT MEETINGS FOR ALTERATION WORK

- A. Preliminary Conference for Alteration Work: Before starting alteration work, conduct conference at Project Site.
1. Attendees: In addition to representatives of Owner, Architect, and Contractor, testing service representative, specialists, and chemical-cleaner manufacturer(s) shall be represented at the meeting.
 2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:
 - a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Fire-prevention plan.
 - c. Governing regulations.
 - d. Areas where existing construction is to remain and the required protection.
 - e. Hauling routes.
 - f. Sequence of alteration work operations.
 - g. Storage, protection, and accounting for salvaged and specially fabricated items.
 - h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
 - i. Qualifications of personnel assigned to alteration work and assigned duties.
 - j. Requirements for extent and quality of work, tolerances, and required clearances.
 - k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.
 3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

- B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at bi-weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner, Architect, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
 2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.
 - a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
 - b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:
 - 1) Interface requirements of alteration work with other Project Work.
 - 2) Status of submittals for alteration work.
 - 3) Access to alteration work locations.
 - 4) Effectiveness of fire-prevention plan.
 - 5) Quality and work standards of alteration work.
 - 6) Change Orders for alteration work.
 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.06 MATERIALS OWNERSHIP

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

1.07 SUBMITTALS

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

1.08 QUALITY ASSURANCE

- A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.
 - 1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
 - a. Construct new mockups of required work whenever a supervisor is replaced.
- B. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.
- C. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.
 - 1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
 - 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- D. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.
- E. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.09 STORAGE AND HANDLING OF SALVAGED MATERIALS

- A. Salvaged Materials:
 - 1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
 - 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area off-site.
 - 5. Protect items from damage during transport and storage.
- B. Salvaged Materials for Reinstallation:
 - 1. Repair and clean items for reuse as indicated.
 - 2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

- C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.
- D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.
 - 1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
 - 2. Secure stored materials to protect from theft.
 - 3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F or more above the dew point.
- E. Storage Space:
 - 1. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.10 PROJECT CONDITIONS

- A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of measured drawings and preconstruction photographs.
 - 1. Comply with requirements specified in Section 01 3233- Photographic Documentation.
- B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- C. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 4 inches or more.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.01 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
 - 1. Use only proven protection methods, appropriate to each area and surface being protected.
 - 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
 - 3. Erect temporary barriers to form and maintain fire-egress routes.
 - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
 - 5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
 - 6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
 - 7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
 - 8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

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

3.02 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:
 - 1. Comply with NFPA 241 requirements unless otherwise indicated.
 - 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.
 - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:
 - 1. Obtain Owner's approval for operations involving use of open-flame or welding or other high-heat equipment. Notify Owner at least 72 hours before each occurrence, indicating location of such work. **Submit a burn permit with Georgia Tech's FSO office prior to any work involving heat generating equipment of combustible materials.**
 - 2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
 - 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
 - 4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.

5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
 6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:
 - a. Train each fire watch in the proper operation of fire-control equipment and alarms.
 - b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
 - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
 - d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
 - e. Maintain fire-watch personnel at Project site until two hours after conclusion of daily work.
- C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.
- D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.
1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.03 PROTECTION DURING APPLICATION OF CHEMICALS

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

3.04 GENERAL ALTERATION WORK

- A. Have specialty work performed only by qualified specialists.
- B. Ensure that supervisory personnel are present when work begins and during its progress.

- C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs or video recordings. Comply with requirements in Section 01 3233 - Photographic Documentation.
- D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
- E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
 - 1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 01 3516

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional submittal procedures in 01 0001 - General Requirements.

1.02 SUMMARY

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

1.03 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager].

1.04 DELEGATED-DESIGN SERVICES

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

1.05 CONFLICTING REQUIREMENTS

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

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

1.06 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- C. Contractor's Quality-Control Plan (FIO): For quality-assurance and quality-control activities and responsibilities.
- D. Qualification Data (FIO): For Contractor's quality-control personnel.
- E. Contractor's Statement of Responsibility (FIO): When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
- F. Testing Agency Qualifications (FIO): For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- G. Schedule of Tests and Inspections (FIO): Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- H. Reports (FIO): Prepare and submit certified written reports and documents as specified.
- I. Permits, Licenses, and Certificates (FIO): For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.07 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 - 3. Owner-performed tests and inspections.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.08 REPORTS AND DOCUMENTS

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

12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.09 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 8. Demolish and remove mockups when directed unless otherwise indicated.

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300 - Submittal Procedures.

- F. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. **Associated Contractor Services:** Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. **Schedule of Tests and Inspections:** Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
 - 1. **Distribution:** Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

- A. **Special Tests and Inspections:** Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 TEST AND INSPECTION LOG

- A. **Test and Inspection Log:** Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. **Maintain log at Project site.** Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 7300 - Execution.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 TEMPORARY UTILITIES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner, Architect, testing agencies, and authorities having jurisdiction.
- B. Provide electrical energy, construction water, drinking water and telephone service required for construction purposes and pay charges and fees incurred until Date of Material Completion.
 - 1. Provide temporary electrical power and lighting lines required for operation of power tools and for illumination of work. Provide following minimum light levels for construction purposes:
 - a. General Construction and Safety Lighting: Five footcandles.
 - b. Finishing Work and Testing: 25 footcandles.
- C. When temporary utilities are no longer required, remove temporary lines, mains and equipment.
- D. Obtain water for construction purposes, in reasonable quantities, from Owner's present facility or local utility. Contractor shall be responsible for obtaining temporary water and for extending lines from source and for making connections.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use. Provide connections and extensions of services as required for construction operations.

1.03 TEMPORARY HEATING, COOLING AND VENTILATING

- A. Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
1. Maintain interior temperatures within allowable ranges required in various Specification Sections. Repair or replace, at no additional cost to Owner, materials and Work damaged by dampness, insufficient or abnormal temperature range.
 2. Provide temporary heat in enclosed spaces to provide minimum temperature of 40° F. until time finishing work begins.
 3. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
 4. After building is enclosed and installation of finishes begins, maintain spaces in temperature range of 60° F. to 80° F. at all times, except as may otherwise be required by product manufacturers for proper product installation and performance. Maintain until Date of Substantial Completion.
- B. After permanent heating, ventilating and cooling systems are installed and inspected by proper authorities, with specific approval of Architect, systems may be utilized for temperature and humidity control.
1. When permanent systems are used assume full responsibility for placing systems in like-new operational status, including replacement of worn parts and cleaning or replacement of pumps, traps, screens and filters before offering Work for acceptance.
 2. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
 3. Maintain relative humidity in a range of 50% to 65% in enclosed spaces after building is enclosed and installation of finishes begins; except as may otherwise be required by product manufacturers for proper product installation and performance. Maintain until Date of Substantial Completion.
 4. Provide ventilation to prevent accumulation of dust, fumes or gases and to cure materials and disperse humidity.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

1.04 DEWATERING FACILITIES AND DRAINS

- A. Do not conduct water onto adjacent properties. Dispose of water in compliance with City and County regulations and local ordinances that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.

1.05 STORAGE AND STAGING

- A. Confine construction related activities, including materials storage, employee and workmen's parking, offices, storage sheds and similar facilities to areas designated by Owner.
- B. Do not encumber other portions of Project site with materials or equipment without written authorization from Architect and Owner.
 - 1. Do not use adjacent properties, either public domain or private property, without written consent of persons or authorities having proper jurisdiction.

1.06 CLEANING UP

- A. Remove debris and rubbish from construction areas and Project site on weekly basis.
 - 1. Provide sufficient trash bins and containers to hold daily accumulation of debris, rubbish, scrap and waste materials.
 - 2. Require workmen of all trades to utilize trash bins and containers. Empty bins and containers on daily basis or as filled, whichever occurs earlier.
- B. Clean mud and construction related debris from roadways and walkways outside construction limits on daily basis.
- C. Upon completion of Work, completely remove excess materials, tools, equipment, temporary construction, remaining trash, rubbish and foreign materials and leave Work clean and neat, ready for occupancy and operations of Owner.

1.07 BARRICADES, BARRIERS AND FENCES

- A. Provide and maintain appropriate barriers around entire Project site and as necessary to enclose construction areas, on-site materials storage areas, to protect public from danger and to safeguard employees and Work.

- B. Special Protection Requirements:
 - 1. Protect buildings and building components from damage, staining or defacing due to the Work. Correct or replace damaged materials or finishes to Owner's satisfaction.
 - 2. Provide protection against overspray of cleaning materials or paint contacting persons or vehicles in drives or parking areas. Do not block drives to extent of restricting vehicular access. Keep parking area restrictions to a minimum. Barriers and restrictions must be approved in advance by Owner. Do not work with materials subject to being blown during times of high winds.
 - 3. Protect surfaces of freshly coated products from damage or discoloration due to dust or physical damage. Replace damaged or defaced materials which cannot be restored to Owner's satisfaction.
 - 4. Protect building from rain or water leakage during course of Work. Do not open joints to extent that openings cannot be protected from inclement weather. Do not leave openings unprotected overnight.

1.08 SECURITY AND PROTECTION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Watchmen: Determine when and provide watchmen necessary for protection of Work on Project site.
 - 1. Neither providing watchmen nor failure to provide watchmen relieves Contractor of responsibility in event of injury to person, theft of materials, or damage to property.
- C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Section 01 1000 – Summary of Work.
- D. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- F. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.

2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
4. Insulate partitions to control noise transmission to occupied areas.
5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
6. Protect air-handling equipment.
7. Provide walk-off mats at each entrance through temporary partition.

1.09 ACCESS TO PROJECT SITE

- A. Make necessary arrangements and obtain required permits for temporary access to Project site from public roads. Provide and maintain temporary all-weather access to Project site.

1.10 PROJECT SIGNS

- A. Provide a Project Sign in location and form acceptable to Owner.
- B. Unless specifically authorized otherwise by Owner, do not erect signs other than Owner construction or Design Firm for advertising within Project site limits. Unauthorized signs are not permitted.

1.11 TEMPORARY FIRE PREVENTION

- A. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses and/or smoke damage. Comply with NFPA 241; manage fire-prevention program.
 1. Prohibit smoking. Comply with additional limits on smoking specified in other Sections.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
 5. Provide fire extinguishers in readily accessible locations.
 6. Periodically inspect fire extinguishers; remove discharged extinguishers immediately and replace with new or recharged extinguishers.

1.12 TRAFFIC CONTROL

- A. Comply with requirements of authorities having jurisdiction.
- B. Employ qualified personnel to direct traffic on streets at accesses to site for construction during peak traffic hours.
- C. Maintain flow of traffic on streets without delaying construction deliveries.

- D. Protect existing site improvements to remain including curbs, pavement, and utilities.
- E. Maintain access for fire-fighting equipment and access to fire hydrants.

1.13 OPERATION, TERMINATION AND REMOVAL

- A. Maintain temporary facilities as long as needed for safe and proper completion of Work.
- B. Termination and Removal: Unless Architect requests that it be maintained longer, remove each temporary facility when need has ended, or when replaced by authority use of permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactory repaired.
- C. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- D. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- E. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- F. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Material Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 7700 - Closeout Procedures and including and not necessary limited to:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts that have been subject to unusual operating conditions.
 - c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

1.14 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.15 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its

use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 5000

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

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

1.03 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in Contract Documents, such as "accessories", "finishes", "structure", "specialties", "systems", and similar terms. Terms that are self-explanatory and have well recognized meanings in the construction industry.
 - 1. "Products" items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 2. "Named Products" items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 3. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form part of the Work.
 - 4. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring, piping,
 - 5. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.04 SUBMITTALS

- A. Basis-of-Design Product Specification Submittal: In compliance with requirements in Section 01 3300 - Submittal Procedures. Show compliance with requirements.
- B. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within ten days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Architect's Approval of Submittal: As specified in Section 01 3300 - Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

1.05 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
 - 3. See individual identification sections requirements on the drawings.
- C. Mock-ups: Mock-ups, as described in individual Specification Sections, must be installed and approved/accepted by Architect prior to beginning manufacture/fabrication of items. Architect's approval of submittals shall not relieve Contractor and manufacturer/fabricator of responsibility of obtaining Architect's approval and acceptance of mock-ups prior to manufacture/fabricator proceeding with fabrication of items.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. General: Requirements specified herein are general in nature. Refer to individual Specification Sections for specific requirements.
- B. Deliver, store, and handle products in compliance with manufacturer's recommendation and written instructions. Using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism.
- C. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
 - 5. Prevent corrosion, soiling or breakage of materials or contact with deleterious materials.
 - 6. Deliver finish materials only after spaces are enclosed and adequate indoor storage facilities are available. Deliver items such as millwork only after spaces approximate completed conditions.
 - 7. Handle materials and equipment to prevent damage, deterioration or contamination. Install no materials which are physically damaged or stained prior to time for installation.
- D. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground a minimum of 6-inches, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's recommendations.
 - 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 6. Protect stored products from damage and liquids from freezing.
 - 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.
 - 8. Store no construction material or equipment within drip line of trees indicated to remain.
 - 9. Store and handle paints and products subject to spillage in areas where spills will not deface finished surfaces or other work.
- E. Flammable or Hazardous Materials:
 - 1. Store minimum quantities in protected areas.
 - 2. Provide appropriate type fire extinguishers near storage areas.
 - 3. Observe manufacturer's precautions and applicable ordinances and regulations.
 - 4. Comply with manufacturer's instructions and recommendations for product storage and handling.
 - 5. Comply with manufacturer's product data in all aspects of basic material usage, handling, installation and substrate preparation, except where more stringent requirements are specified.

1.07 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 7700 - Closeout Procedures.

PART 2 - PRODUCTS

2.01 PRODUCT/MATERIAL SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are new and of quality suited to use intended, suitable for function intended, undamaged and plainly labeled and delivered to Project site in original unopened containers when nature of materials is suitable for containers.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect, whose determination is final.
- B. The Architect has endeavored to specify materials, products and assemblies which are free of asbestos, polychlorinated biphenyl (PCB) or other similar materials believed to endanger the health and safety of construction workers and future building occupants. However, manufacturer's information and other data normally furnished to the Architect by producers of building material products and systems do not always contain accurate, complete or appropriate information for the Architect to properly evaluate each product.

- C. It shall therefore be a requirement of these Contract Documents that neither the Contractor, nor his material suppliers, nor his Subcontractors install or otherwise incorporate any materials containing asbestos, PCB or other hazardous materials within the boundaries of the Project. No soil found on site, or transported to the site from remote locations, which is contaminated with material containing asbestos, PCB, Radon, gasoline, fuel oil, diesel fuel or other similar fossil fuels shall be used for fill, backfill or landscape topsoil.
- D. The Contractor shall require that each of his Subcontractors and material suppliers warrants to Owner and Architect, that all materials, products and assemblies incorporated, or submitted for incorporation into this Project, are free of asbestos, PCB, or other such hazardous materials. This warranty shall include all materials, products and assemblies specified and otherwise required in the Contract Documents. This warranty shall also include materials, components, and accessories not specifically enumerated or detailed in these Contract Documents, but which are required by performance specifications or recommended by manufacturers for complete installation of materials, products and assemblies. If the Contractor or his Subcontractors or material suppliers have knowledge that, or believe that an item, component, material or accessory within a product or assembly may contain asbestos, PCB or other such hazardous material, it is the Contractor's sole responsibility to secure a written certification from the manufacturer of any suspected material stating this material is free of asbestos, PCB or other hazardous materials.
- E. Products that are specified by reference standards or in descriptive manner without a manufacturer's name, model number or trade name, shall be selected by the Contractor, shall comply with all specified requirements, and shall not contain asbestos, PCB or other hazardous materials in any form. The Contractor shall be responsible for determining that materials requested for substitution are free of asbestos, PCB or other similar materials known to endanger the health and safety of construction workers and future building occupants.
- F. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select product that complies with standards, codes or regulations specified.
- F. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select product that complies with standards, codes or regulations specified.
- G. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: ..."
 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: ..."
 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: ..."
 4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

- a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: ..."
 5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: ..."
 6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: ..."
 7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 2500 "Substitution Procedures" for substitutions for convenience.
- H. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 2500 - Substitution Procedures" for proposal of product.
- I. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.02

COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 2. Evidence that proposed product provides specified warranty.
 3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 4. Samples, if requested.
- B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 6000

SECTION 01 7300

EXECUTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional record document submittal procedures in 01 0001 General Requirements.

1.02 DEFINITIONS

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

1.03 PREINSTALLATION MEETINGS

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

1.04 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Qualification Data: For professional engineer as specified in GT Yellowbook 02 2100 - Surveys.
- C. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
- D. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.

3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- E. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- F. Certified Surveys: Submit two copies signed by professional engineer.
- G. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.05 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Plumbing piping systems.
 - f. Mechanical systems piping and ducts.
 - g. Control systems.
 - h. Fire-detection and -alarm systems.
 - i. Electrical wiring systems.
 - j. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Sprayed fire-resistive material.
 - d. Equipment supports.
 - e. Piping, ductwork, vessels, and equipment.
 - f. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.01 MATERIALS

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

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 3100 - Project Management and Coordination.

3.03 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.04 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Comply with Section 01 7700 - Closeout Procedures for repairing or removing and replacing defective Work.

3.05 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 1000 – Summary of Work.
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
 6. Patching Storefront Aluminum Frames: After removal of conduit from aluminum frames, clean and patch holes with epoxy adhesive. Apply epoxy mixture to the area with a putty knife. Precisely cover area for a seamless look. Treat the damaged area and the nearby area with a fine-grit sandpaper. Paint to match existing.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.
1. Speakers: Clean existing speakers with cleaning methods that match the material or finish of speaker cabinets. Consult speaker manufacturer for information on cleaning methods.

3.06 OWNER-INSTALLED PRODUCTS

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

3.07 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.08 STARTING AND ADJUSTING

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

- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 - Quality Requirements.

3.09 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 7300

SECTION 01 7700
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to “Georgia Tech Yellow Book” Design Standards current edition for requirements in regard to Construction Document Review and Archival Documents in 01 0001 – General Requirements and O&M procedures in 01 7801 –Closeout Procedures.

1.02 SUMMARY

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

1.03 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Transmittals: Obtain copy of excel spreadsheets for closeout submittals from the Georgia Tech Facilities Web page <http://www.facilities.gatech.edu/standards-forms>.
- C. Product Data: For each type of cleaning agent.
- D. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- E. Certified List of Incomplete Items: Final submittal at final completion.

1.04 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.05 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.06 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
 - 5. Submit testing, adjusting, and balancing records.
 - 6. Submit sustainable design submittals not previously submitted.
 - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 - 5. Advise Owner of changeover in utility services.
 - 6. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 - 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 8. Complete final cleaning requirements.
 - 9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.07 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01 2900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.
5. Submit final completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.08 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. Architect will return annotated file.
 - b. PDF electronic file. Architect will return annotated file.
 - c. Web-based project software upload. Utilize software feature for creating and updating list of incomplete items (punch list).
 - d. Three paper copies. Architect will return two copies.

1.09 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 1. Submit as per Project Close Out Documentation in GT Yellow book 01 0001 General Requirements section.
- E. Warranties in Paper Form:
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.01 FINAL CLEANING

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

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with Section 013546 – Indoor Air Quality (IAQ) Procedures. Provide written report on completion of cleaning.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 5000 - Temporary Facilities and Controls. Prepare written report.

3.02 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

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

END OF SECTION 01 7700

SECTION 01 7839

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional record document submittal procedures.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modification to Contract.
 - 5. Approved Shop Drawings, Product Data and Samples.
 - 6. Miscellaneous record submittals.
 - 7. Field Test records.

1.03 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and one of file prints.
 - 3) Submit record digital data files and one set(s) of plots.
 - 4) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit three paper-copy set(s) of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and three set(s) of prints.
 - 3) Print each drawing, whether or not changes and additional information were recorded.
 - c. Final Submittal:
 - 1) Submit one paper-copy set(s) of marked-up record prints.
 - 2) Submit record digital data files and three set(s) of record digital data file plots.
 - 3) Plot each drawing file, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.04 RECORD DRAWINGS

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

3. Refer instances of uncertainty to Architect for resolution.
 4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
 - a. See Section 01 3100 - Project Management and Coordination for requirements related to use of Architect's digital data files.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

1.05 RECORD SPECIFICATIONS

- A. Preparation: Mark Field Record Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file.

1.06 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- C. Format: Submit record Product Data as annotated PDF electronic file.

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

1.07 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file(s) of marked-up miscellaneous record submittals.
 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.08 MAINTENANCE OF RECORD DOCUMENTS

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 7839

SECTION 02 4119
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional procedures in 01 3546 Indoor Air Quality (IAQ) Procedures during demolition.

1.02 DEFINITIONS

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

1.03 MATERIALS OWNERSHIP

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

1.04 PREINSTALLATION MEETINGS

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

1.05 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Qualification Data: For refrigerant recovery technician.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- E. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 3233 - Photographic Documentation. Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.06 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.07 QUALITY ASSURANCE

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

1.08 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

- E. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- F. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 4-inches or more.
- G. Storage or sale of removed items or materials on-site is not permitted.
- H. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.09 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
 - 1. Roof Warranty.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.10 COORDINATION

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

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- D. Survey of Existing Conditions: Record existing conditions by use of measured drawings.
 - 1. Comply with requirements specified in Section 01 3233 - Photographic Documentation.
 - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.02 PREPARATION

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

3.03 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.04 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 5000 - Temporary Facilities and Controls.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.05 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
 - 6. Maintain adequate ventilation when using cutting torches.
 - 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 10. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.

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

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

3.06 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

- D. 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.

3.07 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and recycle or dispose of them properly.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

- B. Burning: Do not burn demolished materials.

3.08 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.09 SELECTIVE DEMOLITION SCHEDULE

- A. Remove: As indicated on Drawings.

END OF SECTION 02 4119

SECTION 03 5413

GYPSUM CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 REFERENCE STANDARDS

- A. American Society of Testing and Materials (ASTM):
1. C 109 Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in Cube Specimens).
 2. C 219 Standard Terminology Relating to Hydraulic Cement.
 3. E 90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 4. E 119 Test Methods for Fire Tests of Building Construction and Materials.
 5. E 413 Classification for Rating Sound Insulation.
 6. E 492 Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine.
 7. E 989 Classification for Determination of Single-Number Metrics for Impact Noise.
 8. F 1869 Test Method for Measuring Moisture Vapor.

1.03 ACTION SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: For each type of product.
- C. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.
- D. Sustainable Construction Submittals:
1. Indicate compliance with the Georgia Energy Efficiency and Sustainability Construction Standards for State Buildings dated July 1, 2009. Submit completed Section 6.3-Georgia based Materials and Products document. Refer to the requirements of Section 01 8113 – Sustainable Design Requirements, Georgia Peach Program.

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
 - 1. Place gypsum cement underlayments only when ambient temperature and temperature of substrates are between 50 and 95 deg F.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.02 GYPSUM CEMENT UNDERLAYMENTS

- A. Gypsum Cement Underlayment: Self-leveling, gypsum cement product that can be applied in minimum uniform thickness of 1/4-inch and that can be feathered at edges to match adjacent floor elevations. Subject to compliance with requirements, provide products by one of the following:
 - 1. Acceptable Manufacturers:
 - a. Custom Building Products.
 - b. Euclid Chemicals Company; an RPM Company.
 - c. Laticrete International, Inc.
 - d. Maxxon Corporation
 - e. Schonox, HPS North America, Inc.
 - f. USG Corp.
 - 2. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C 219.
 - 3. Compressive Strength: 2500 psi at 24 hours, 5000 psi at 28 days, 6000 psi at 56 days, when tested according to ASTM C 1708.
 - 4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch; or coarse sand as recommended by underlayment manufacturer.
 - 1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than 70 deg F.
- D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
- E. Corrosion-Resistant Coating: Recommended in writing by underlayment manufacturer for metal substrates.
- F. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
 - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
 - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
 - 1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate in compliance with the floor covering manufacturers' limits.
- C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.03 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
 - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
 - 2. Coordinate application of components to provide optimum adhesion to substrate and between coats.
 - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply underlayment to produce uniform, level surface.
 - 1. Apply a final layer without aggregate to product surface.
 - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Apply surface sealer at rate recommended by manufacturer.
- G. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.04 PROTECTION

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

END OF SECTION

SECTION 05 5000

METAL FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
 1. A36/A36M Carbon Structural Steel.
 2. A53/A53M Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 3. A123/A123M Zinc Hot-Dip Galvanized Coatings on Iron and Steel Products.
 4. A153 Zinc Coating Hot-Dip on Iron and Steel Hardware.
 5. A307 Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 6. A325 Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 7. A490 Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
 8. A563 Carbon and Alloy Steel Nuts.
 9. A780 Repair of Damaged Hot-Dip Galvanizing.
 10. A1008 Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 11. C1107 Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- B. American Welding Society (AWS):
 1. A5.1 Covered Carbon Steel Electrodes for Shielded Metal Arc Welding.
 2. D1.1 Structural Welding Code - Steel.

1.03 SUMMARY

- A. Section Includes:
 1. Steel framing and supports for corridor benches.
 2. Steel framing and supports for mechanical and electrical equipment.
 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.

1.04 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.05 SUBMITTALS

- A. Product Data: For the following:

1. Fasteners.
 2. Shop primers.
 3. Shrinkage-resisting grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
1. Steel framing and supports for rated movable partition.
 2. Steel framing and supports for mechanical and electrical equipment.
 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- C. Delegated-Design Submittal:
1. Masonry Screws: Engage qualified professional engineer to prepare design calculations, Shop Drawings, and other structural data.
 - a. Professional Engineer Qualifications: Professional engineer legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Include analysis data of allowable stress design.
- D. Qualification Data (FIO): For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- E. Welding certificates (FIO).
- F. Research Reports (FIO): For post-installed anchors.

1.06 QUALITY ASSURANCE

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

1.07 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 - Quality Requirements, to design ladders.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces Insert temperature change.

2.02 MATERIALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
1. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
 2. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.
 3. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.
 4. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
 5. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- B. Fasteners: Provide anchors, bolts, expansion devices, and miscellaneous accessory items necessary to a complete and finished installation. Provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
1. Provide stainless steel fasteners for fastening aluminum, stainless steel or nickel silver.
 2. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers. Provide ASTM A325, or A490 as required.
 3. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 3, heavy-hex steel structural bolts; ASTM A563, Grade DH3, heavy-hex carbon-steel nuts; and where indicated, flat washers.
 4. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1.
 5. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 - a. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
 6. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in compliance with ASTM E488/E488M, conducted by a qualified independent testing agency.
 7. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
 8. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
 - a. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
 - b. Adhesive anchor system for masonry application in compliance with ASTM E1512, ASTM E 488, ICC-ES AC58 and AC60.

- C. Shop Primers:
1. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - a. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
 2. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
 3. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
 4. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- D. Galvanizing Repair Paint: ASTM A 780; brush apply two coats. High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
1. PPG Industries "Aguapon Zinc Rich Primer"
 2. Sherwin-Williams "Zinc-Clad 5 Organic B69A45".
 3. ZRC Worldwide "Z.R.C. Cold Galvanizing Compound".
- E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M For items to be embedded in concrete, provide alkali-resistant bituminous coating.
- F. Shrinkage-Resistant; Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Anchoring Cement: ASTM C1107, quick setting, self leveling, pourable cement base; waterproof, non shrink exterior erosion-resistant anchoring cement.
1. Adhesives Technology "Hard-Rok".
 2. BASF, "MasterFlow 110 AN".
 3. ProSpec "High Strength Precision Grout".
 4. Five Star Products, Inc., "Five-Star Grout".
- H. Miscellaneous Steel Trim: Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
1. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - a. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
 2. Galvanize and prime miscellaneous steel trim.
 3. Prime miscellaneous steel trim with zinc-rich primer.
- I. Loose Steel Lintels: Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
1. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.
 2. Galvanize and prime loose steel lintels located in exterior walls.
 3. Prime loose steel lintels located in exterior walls with zinc-rich primer.

- J. Miscellaneous Framing and Supports: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
 - 1. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - a. Fabricate units from slotted channel framing where indicated.
 - b. Furnish inserts for units installed after concrete is placed.
 - 2. Galvanize miscellaneous framing and supports where indicated.
 - 3. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.03 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

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

3.02 REPAIRS

- A. Touchup Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
 - 2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 9000 - Paints and Coatings.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 05 5000

SECTION 06 1000
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
1. Wood blocking, and nailers.
 2. Plywood backing panels.

1.03 REFERENCE STANDARDS

- A. American Plywood Association (APA):
1. PRP-108 Performance Standards and Policies for Structural-Use Panels, Form No. E445M.
 2. Form No. E30K APA Design/Construction Guide – Residential & Commercial.
- B. American Society for Testing and Materials (ASTM):
1. E 84 Test Method for Surface Burning Characteristics of Building Materials.
 2. D 5664 Test Method for Evaluating the Effects of Fire-Retardant Treatments and Elevated Temperatures on Strength Properties of Fire-Retardant Treated Lumber.
- C. American Wood Preservers Association (AWPA):
1. C1 All Timber Products - Preservative Treatment by Pressure Process.
 2. C2 Lumber, Timbers, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.
 3. C9 Plywood - Preservative Treatment by Pressure Process.
 4. C20 Structural Lumber - Fire-Retardant Treatment by Pressure Processes.
 5. C27 Plywood - Fire Retardant Treatment by Pressure Processes.
 6. M4 Care of Preservative-Treated Wood Products.
- D. National Institute of Standards and Technology (NIST):
1. PS 1 Structural Plywood.
 2. PS 20 American Softwood Lumber Standards.
- E. Southern Pine Inspection Bureau (SPIB):
1. Standard Grading Rules for Southern Pine Lumber.
- F. Western Wood Products Association (WWPA):
1. Western Lumber Grading Rules.

1.04 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

- B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.
- D. OSB: Oriented strand board.
- E. Timber: Lumber of 5 inches nominal size or greater in least dimension.

1.05 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.06 INFORMATIONAL SUBMITTALS (FIO)

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Engineered wood products.
 - 4. Power-driven fasteners.
 - 5. Post-installed anchors.
 - 6. Metal framing anchors.

1.07 QUALITY ASSURANCE

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

1.08 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

- A. Source Quality Control: Factory mark each piece of lumber and plywood with grade stamp of grading agency, mill identification mark, trade mark of SPIB, APA, and other associations having jurisdiction.
- B. Lumber:
1. Standard yard dimension lumber, graded and sized in compliance with NIST DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - a. Provide dressed lumber, S4S, unless otherwise indicated.
 - b. Provide seasoned lumber with maximum 19% moisture content, "S-Dry" or "KD-19", unless otherwise indicated.
 2. General Utility Purposes; Plates, Blocking, Bracing, Nailers, and Grounds: Utility Grade or No. 3 Boards, Southern Pine, pressure treated.
 3. Framing: Southern Pine, graded under SPIB rules in the grades following:
 - a. General Light Framing: No. 2 Dimension, 1200 psi "f" or Standard Grade.
 - b. Exposed Framing Lumber: Select Structural Grade.
 - c. Paint Finish Exposed Boards: No. 1 Grade.
- C. Plywood: Group 1, fir plywood, graded and sized in compliance with NIST PS 1 and APA PRP-108. Provide seasoned plywood with maximum 15% moisture content.
1. Exposed Plywood, with exterior glue.
 2. Concealed Plywood:
 - a. Exterior: APA C-C Plugged EXT.
 - b. Interior: APA C-D Plugged INT, with exterior glue. Provide exterior type plywood, APA C-C Plugged EXT, with exterior glue for interior areas exposed to high humidity or moisture.
 - c. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.
- D. 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.
1. Allowable design stresses, as published by manufacturer, shall 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.

2.02 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b for construction not in contact with ground and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat all rough carpentry unless otherwise indicated.
 - 1. Wood nailers, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with concrete.

2.03 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.
- D. Application: Treat all rough carpentry unless otherwise indicated.
 - 1. Concealed blocking.
 - 2. Framing for non-load-bearing partitions.
 - 3. Plywood backing panels.

2.04 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.

- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.05 METAL FRAMING ANCHORS

- A. Allowable design loads, as published by manufacturer, shall meet or exceed those indicated of basis-of-design products of products of manufacturers listed. 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. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
 - 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
 - 1. Use for wood-preservative-treated lumber and where indicated.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304.
 - 1. Use for exterior locations and where indicated.

2.06 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4-inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- C. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.
- D. Adhesives for Gluing Furring and Sleepers to Concrete: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
- E. 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

3.01 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- F. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- G. Do not splice structural members between supports unless otherwise indicated.
- H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- I. Set work accurately to required lines and levels, members plumb and true and accurately cut and fitted.
 - 1. Cut out and replace crooked, warped, bowed and otherwise defective material, even if material is within specified grade limits.
- J. Securely attach wood to steel with carriage bolts or countersunk machine bolts; to concrete with anchor bolts or Kwik-Bolts; to hollow masonry with toggle bolts; to wood with nails, spikes, screws and bolts as applicable.
 - 1. Provide standard washers for bolt heads and nuts bearing upon wood.
 - 2. Provide fasteners of size not to penetrate members where opposite side will be exposed to view or will receive finish materials. Pre-drill as required; install fasteners without splitting wood.
- K. Provide wood strips, furring, nailers, grounds, blocking for toilet accessories and handrails, and framing of thicknesses, sizes and shapes required for gypsum board, countertop framing, wood trim, and other related work.
 - 1. Erect true-to-lines and levels. Do not deviate from true alignment more than 1/8-inch in 10'-0".
 - 2. Space members 1'-4" on center, unless indicated otherwise.
- L. Construct members of continuous pieces of longest possible lengths.
- M. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.

4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- N. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- O. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
1. Use inorganic boron for items that are continuously protected from liquid water.
 2. Use copper naphthenate for items not continuously protected from liquid water.
- P. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- Q. Securely 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. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 3. ICC-ES evaluation report for fastener.
- R. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
1. Comply with approved fastener patterns where applicable.
 2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
 3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.02 WOOD BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.03 PROTECTION

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

- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1000

SECTION 06 4116

ARCHITECTURAL CABINETRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional requirements in 092000 - Gypsum Board Assemblies.

1.02 SUMMARY

- A. Section Includes:
 - 1. Specially fabricated cabinet units.
 - 2. Countertops.
 - 3. Millwork slat walls.
 - 4. Cabinet hardware.
 - 5. Preparation for installing utilities.
- B. Related Requirements:
 - 1. Section 06 1000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

1.03 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI):
 - 1. A 156.9 Cabinet Hardware.
 - 2. A 208.2 Medium Density Fiberboard (APA).
- B. American Plywood Association (APA):
 - 1. PRP-108 Performance Standards and Policies for Structural-Use Panels, Form No. E445M.
 - 2. Form No. E30K APA Design/Construction Guide – Residential & Commercial.
- C. American Society for Testing and Materials (ASTM):
 - 1. D 2559 Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions.
- D. Architectural Woodwork Institute (AWI):
 - 1. Architectural Woodwork Standards, 2nd Edition.
- E. National Electrical Manufacturers Association (NEMA):
 - 1. LD 3 High Pressure Decorative Laminates.
- F. National Institute of Standards and Technology (NIST):
 - 1. PS 1 Structural Plywood.
 - 2. PS 20 American Softwood Lumber Standards.
- G. Hardwood Plywood and Veneer Association (HPVA):

1. HP-1 Hardwood and Decorative Plywood.

- H. Southern Pine Inspection Bureau (SPIB):
1. Standard Grading Rules for Southern Pine Lumber.

1.04 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.05 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: For each type of product.
1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
1. Include plans, elevations, sections, and attachment details at a minimum scale of 3/8-inch=1'-0".
 2. Show large-scale details at a minimum scale of 1-1/2 inch to 1 foot (1:8).
 3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 4. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, power outlets and other items installed in architectural cabinets.
 5. Indicate field verified dimensions and conditions on Shop Drawings.
 6. Indicate joints in veneer and high pressure decorative laminate work.
 7. Indicate matching of veneers and direction of grain.
- D. Samples: For each exposed product and for each color and texture specified, in manufacturer's or fabricator's standard size.
1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
 - a. Provide one sample applied to core material with specified edge material applied to two edges, including one corner where edges intersect.
 2. Thermoset Decorative Panels: 8 by 10 inches, for each color, pattern, and surface finish.
 - a. Provide edge banding on one edge.
 3. Corner Pieces:
 - a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - b. Miter joints for standing trim.
 4. Hardware: Submit one actual sample item for each type and finish of proposed pulls, hinges, shelf standards, and drawer slides, demonstrating hardware design, quality, and finish.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified herein with minimum five years of documented experience.

- B. Millwork Fabricator and Installer Qualifications: Company specializing in fabricating and installing products specified herein with minimum five years of documented experience.
 - 1. Company with at least one project in past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- B. Package and ready materials in compliance with manufacturer's recommendations.
- C. Store products protected from light, heat and moisture. Do not store in contact with floor or outside wall surfaces. Do not expose to continuous direct sunlight.
- D. Store horizontally, face-to-face and back-to-back with top sheet turned face down.
- E. Handle sheets by sliding when possible.
- F. Provide protective coverings of suitable material. Take special precautions at corners.

1.08 PROJECT CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at occupancy levels.
- B. Prior to installation, verify that blocking or reinforcement is present and sufficient to adequately support anticipated final loads. Where not present, provide and install such blocking or reinforcement as to adequately support millwork and anticipated final loads.
- C. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work to ensure that millwork can be supported as required and installed as indicated.
- D. Field Measurements: Verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements, and indicate measurements on Shop Drawings.
- E. Established Dimensions: Where paneling is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- F. Coordinate locations of items from other trades, such as switches, power outlets, appliances (Owner furnished and otherwise), light fixtures, and other similar items with shop drawings, fabrication, and installation.

PART 2 - PRODUCTS

2.01 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.

1. Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

B. Grade: Custom.

2.02 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Softwood Lumber: NIST PS 20; Graded in compliance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as required to provide for a suitable substrate for material covering lumber.
2. Hardwood Lumber: NHLA; Graded in compliance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as required to provide for a suitable substrate for material covering lumber.

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

1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130
2. Softwood Plywood: DOC PS 1, medium-density overlay.
3. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

C. Plywood: Provide as substrate/core material for millwork and plastic laminate construction, unless noted otherwise, and as substrate for countertops where required by countertop manufacturer: NIST PS 1, core of wood plies from listed species unless otherwise indicated, balanced construction with faces, thickness, and moisture content to produce a warp-free panel suitable for its intended uses, as indicated and as required by application. Thickness to be 3/4-inches unless noted otherwise.

1. Concealed Surfaces: PS 1; APA B-B Grade, rotary cut face veneer of species as appropriate for application.
2. Provide Type I waterproof adhesive plywood panels for base cabinet millwork (floor mounted cabinets) with or without sinks, and other millwork unless specified otherwise.
3. Provide Type II interior water-resistant adhesive plywood panels for wall cabinet millwork (upper cabinets).

D. Marine Grade Plywood: PS 1; APA B-B Grade as indicated in Drawings.

2.03 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.

3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.04 LAMINATE MATERIALS

- A. Basis-of-Design Manufacturers: In Accordance with Finish Schedule.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and required by woodwork quality standard.
 1. Provide specific types as follows:
 - a. Horizontal Surfaces: HGS, 0.048 inch (1.22 mm) nominal thickness, through color, colors as scheduled, finish as scheduled.
 - b. Vertical Surfaces: VGS, 0.028 inch (0.71 mm) nominal thickness, through color, colors as scheduled, finish as scheduled.
 - c. Post-Formed Vertical Surfaces: VGP, 0.028 inch (0.71 mm) nominal thickness, through color, colors as scheduled, finish as scheduled.
 - d. Cabinet Liner: CLS, 0.020 inch (0.51 mm) nominal thickness, through color, colors as scheduled, finish as scheduled.
 - e. Laminate Backer: BKL, 0.020 inch (0.51 mm) nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.
 - f. Edges: VGS, of same type and requirements as for faces.

2.05 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS ACCESSORIES

- A. Adhesive: Type recommended by AWI/AWMAC to suit application and as recommended by laminate manufacturer.
- B. Sealant: Premier Building Solutions "XtraBond 150-RTV Silicone Sealant". Standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone - any type), UL-listed silicone sealant in colors matching components.
 1. Color: To be selected by Architect.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; stainless steel finish in concealed and exposed locations.
- E. Stainless Steel Trim Molding: 430 stainless steel #4 brushed trim moldings in flat profile, 18 gauge, 4-inch high.
- F. Concealed Joint Fasteners: Threaded steel.
- G. Furring, Blocking, Shims, and Hanging Strips: Provide fire retardant lumber as specified in 06 1000, kiln dried to less than 15 percent moisture content.
- A. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.

- B. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- C. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

2.06 HARDWARE

- A. Hardware: BHMA A156.9, types as indicated for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated shelf rests for nominal 1-inch (25 mm) spacing adjustments.
 - 1. Finish: Vinyl coated steel.
 - 2. Basis-of-Design Manufacturer and Type:
 - a. Knapé & Vogt; www.kv.com; Product: 348 Series Vinyl Coated Steel Shelf Support.
- C. Drawer and Door Pulls:
 - 1. DP-1: Engineered Products Company Product "Model MC402-4-SS", "U" shaped wire pull with 4-inch centers.
 - a. Finish: Satin stainless steel.
- D. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.
- E. Drawer Slides:
 - 1. Basis-of-Design Manufacturers and Type: Accuride International, Inc; Product Full Extension Heavy Duty Slide Model 4032: www accuride.com.
 - 2. Other Acceptable Manufactures:
 - a. Grass America Inc: www.grassusa.com.
 - b. Knapé & Vogt Manufacturing Company: www.knapendvogt.com.
 - 3. Type: Full extension.
 - 4. Static Load Capacity: Heavy Duty grade, minimum 150 lb. load capacity.
 - 5. Mounting: Side mounted.
 - 6. Stops: Integral type.
 - 7. Ball Bearings: Steel.
- F. Undermount Drawer Slides: BHMA A156.9, Grade 1.
 - 1. Basis-of-Design Manufacturer: Grass America Inc. "Dynapro". Full extension, 110 lb load capacity.
 - 2. Other Acceptable Manufacturers:
 - a. Blum, Inc.
 - b. Hafele.
- G. Hinges: European style concealed self-closing type, steel with satin finish. BHMA A156.9, grade 2, B01602.
 - 1. Basis-of-Design Manufacturers and Type: Grass America Inc; "Tiomos 110". 110 degrees of opening.
 - 2. Basis-of-Design Manufacturers and Type: Grass America Inc; "Tiomos 95": 95 degrees of opening for end panels adjacent to barriers such as walls.
 - 3. Other Acceptable Manufactures
 - a. Blum, Julius & Co., Inc.
 - b. Hafele.

- H. Silencers: Provide self-adhering clear silencers at top and bottom of each cabinet door and at each side of each drawer.
- I. Door Locks: BHMA A156.11, E07121.
 - 1. Provide where indicated on drawings.
 - 2. Coordinate keying with Owner's requirements.
 - 3. Provide recessed mounted strike plates.
- J. Drawer Locks: BHMA A156.11, E07041.
 - 1. Provide where indicated on drawings.
 - 2. Coordinate keying with Owner's requirements.
- K. Grommets for Cable Passage: 2-inch OD, metal grommets and matching metal caps with slot for wire passage.
 - 1. Color: Powder coated matched to adjacent wall color.
- L. Grommets for Trash Disposal (If Applicable): 8-inch OD, metal grommet.

2.07 FABRICATION

- A. Cabinetry:
 - 1. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
 - 2. Measurements: Before proceeding with fabrication to be fitted to other construction, obtain field measurements and verify dimensions of Shop Drawing details.
 - 3. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 4. Notify Architect seven days in advance of dates and times architectural cabinet fabrication will be complete.
 - 5. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
 - 6. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
 - 7. Perform "Premium Grade" Work in compliance with recommendations of applicable Section 10 of Architectural Woodwork Institute Quality Standards.
 - 8. Fabricate casework to flush overlay construction.
 - 9. Tops and/or bottoms on fillers and open corner panels are required when surfaces are defined herein as 'exposed'. Finish to match veneers of exposed surfaces.
 - 10. Treat edges as 'exposed' when any part is visible through gap greater than 1/8-inch with doors/drawers closed. Finish to match veneers of exposed surfaces.

- B. High Pressure Decorative Laminate Work:
 - 1. Apply high pressure decorative laminate finish in full uninterrupted sheets; with hairline corners and joints. Laminate to core material under pressure with hydraulic presses and cold setting adhesive.
 - 2. Cap exposed edges with material of same finish and pattern.
 - 3. Locate counter butt joints minimum 2'-0" from sink cutouts.
 - 4. Mechanically fasten backsplash to countertop 16-inches on center.
 - 5. Make cutouts for lavatories, plumbing fixtures, and toilet accessories using templates or physical samples of items.
 - 6. Conceal all edges of high pressure decorative laminate with matching solid color core high pressure decorative laminate.

PART 3 - EXECUTION

3.01 PREPARATION

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

3.02 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.03 INSTALLATION

- A. Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work with minimum gaps of 1/32-inch. Do not use additional overlay trim for this purpose. Refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with toggle bolts through metal backing or metal framing behind wall finish.
- E. Secure cabinets to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with plugs of same adjacent material; finish flush with surrounding surfaces.
- G. Seal transitions between adjacent materials and at backsplash with sealant as specified herein.

3.04 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.
- D. Clean panels upon completion of installation to remove dust or foreign materials from the fabric, using a dry brush, a vacuum, or both.
- E. Maintain conditions that ensures fabric covered tack board panels are without damage or deterioration at time of Substantial Completion.
- F. Replace panels that cannot be cleaned and repaired, in a manner acceptable to Architect, prior to the time of Substantial Completion.

3.05 PROTECTION

- A. Protect completed work and all finished surfaces from damage until acceptance of installation by Owner.
- B. Touch up marred finishes, or replace cabinetry, and millwork items that cannot be restored to new appearance. Use only materials and procedures recommended or furnished by laminate manufacturer.

END OF SECTION

SECTION 07 8400

FIRE AND SMOKE PROTECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
 - 1. E 84 Surface Burning Characteristics of Building Materials.
 - 2. E 119 Fire Tests of Building Construction and Materials.
 - 3. E 814 Fire Tests of Through-Penetration Fire Stops.
 - 4. E 1966 Test for Fire Resistance of Building Joint Systems.
 - 5. E 2307 Test for Fire Resistance of Perimeter Edge Firestop Systems.
- B. National Fire Protection Association (NFPA):
 - 1. 101 Code for Safety to Life from Fire in Buildings and Structures.
- C. Underwriters Laboratories Inc. (UL):
 - 1. JAN Fire Resistance Directory.
 - 2. JAN Building Materials Directory.
 - 3. 263 Standard Fire Test of Building Construction and Materials.
 - 4. 1479 Fire Tests of Through Penetration Firestops.
 - 5. 2079 Tests for Fire Resistance of Building Joint Systems.

1.03 DEFINITIONS

- A. Firestopping: Material or combination of materials used to seal openings and joints in fire-resistance rated wall and/or floor assemblies.
- B. Fire-Resistant Joint System: The use of specific firestop material or combination of materials in conjunction with a specific wall or floor construction type and specific penetrant(s), constitutes a "System". Assembly of specific materials or products that are designed, tested, and fire-resistance rated in accordance with UL 2079 or ASTM E1966 to resist for a prescribed period of time the passage of fire through joints made in or between fire-resistance-rated assemblies.
- C. Through-penetration: An opening that passes through an entire assembly.
- D. Membrane-penetration: An opening made through one side (wall, floor or ceiling membrane) of an assembly.
- E. Construction Gaps: Any gap, joint, or opening, whether static or dynamic, where the top of a wall may meet a floor; wall-to-wall applications; edge-to-edge floor configurations; floor-to-exterior wall; or any linear breach in a rated barrier. Where movement is required, the firestopping system must comply with UL 2079 or ASTM E1966 for dynamic joints.

- F. Joint: Linear opening in or between adjacent fire-resistance-rated assemblies that is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind, or any other loading.
 - 1. Static (non-movement).
 - 2. Dynamic (movement): Silicone products have greater movement capability than acrylic products.
- G. F-Rating: A rating expressed in hours indicating a specific length of time that a fire-resistive barrier can withstand fire before being consumed or before permitting the passage of flame through an opening in the assembly when tested in compliance with ASTM E814 or UL 1479.
- H. T-Rating: A rating expressed in hours indicating the length of time that the temperature on the non-fire side of a fire-rated assembly does not exceed 325F above ambient temperature when tested in compliance with ASTM E814.
- I. Integrity Rating: One of two hourly ratings for perimeter fire-containment systems. Integrity rating is a measure of the perimeter fire containment system's ability to withstand the fire exposure test without permitting the passage of flame through openings or the occurrence of flaming on any element of the unexposed surface of the fill material or floor or on the interior surface of the curtain wall above the fill material tested in compliance with ASTM E2307 or ASTM E119.
- J. Insulation Rating: One of two hourly ratings for perimeter fire-containment systems. Insulation rating is a measure of the perimeter fire containment system's resistance to both flame passage and heat transfer and requires the maximum temperature rise on the unexposed surface of the fill material or on the interior surface of the curtain wall one-inch above the fill material not to exceed 325 deg. F. above the starting temperature. For perimeter fire containment systems having a clearance distance of 6-inches or greater between the curtain wall and edge of slab, the insulation rating also requires the average temperature rise on the unexposed surface of the fill material not to exceed 250 deg. F. above the starting temperature.

1.04 ACTION SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: Submit product data and installation instructions for each type installation. Include installation details and manufacturer's certification that each type of firestopping materials meets specified requirements.
- C. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 - 2. Submit manufacturer's "engineering judgment" drawings for nonstandard installations where no UL tested system exists.
- D. Qualification Data (FIO): Submit Contractor qualifications as described in "Quality Assurance" Article. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Product Schedule: For each firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

- F. Qualification Data; (FIO): For Installer.
- G. Quality Assurance/Control Submittals; (FIO):
 - 1. Product Certificates: Signed by firestopping manufacturers certifying their products comply with specified requirements and that materials were installed in compliance with manufacturer's installation instructions and details.
 - a. Certificate, or other documentation, from selected specified manufacturers stating Installer has been trained in proper installation and is recognized as qualified to install such manufacturers products.
 - 2. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.
- H. Product Test Reports; (FIO): For each penetration firestopping system, for tests performed by a qualified testing agency.

1.05 CLOSEOUT SUBMITTALS

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

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
- B. Single Source Responsibility: Obtain through-penetration and fire-resistant joint firestop systems for each kind of penetration and construction indicated from a single manufacturer.
- C. Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistive ratings indicated, as determined per ASTM E 1966 or UL 2079, but not less than that equaling or exceeding fire-resistance rating of construction in which joint occurs.
- D. Firestopping materials and systems must be capable of closing or filling through-openings created by 1) burning or melting of combustible pipes, cable jacketing, or pipe insulation materials, or 2) deflection of sheet metal due to thermal expansion (electrical and mechanical duct work).
- E. Firestopping material must be asbestos and lead free and shall not incorporate nor require use of hazardous solvents.
- F. Firestopping sealants must be flexible, allowing for normal pipe movement.
- G. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
- H. Firestopping materials shall be moisture resistant and not dissolve in water after curing.
- I. For applications where combustible penetrants are involved, i.e., insulated and plastic pipe, install suitable intumescent material.
- J. Age Testing Compliance: Provide written verification from UL of the firestop products passing the "Aging and Environmental Exposure" portion of UL 1479 test.

- K. Perimeter Edge Firestop Joint Sealants: Provide joint sealants with fire-resistant ratings indicated as determined per ASTM E119 or ASTM E2307, but not less than the required rating of the rated floor assembly.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver firestopping materials to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time and mixing instructions for multi-component materials.
- B. Store and handle firestopping materials to prevent their deterioration and damage due to moisture, temperature changes, contaminants, or other causes.
- C. Install all firestop materials prior to expiration of shelf life.

1.08 PROJECT CONDITIONS

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

1.09 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.
- C. Have firestopping system inspected if required by Authorities Having Jurisdiction after installation and before concealing.
- D. Firestopping shall precede gypsum board finishing.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

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

2.02 FORMING MATERIALS

- A. Fire Safing Insulation; Manufacturer and Type: Minimum 4 pcf density bonded, compressible, semi-rigid mineral fiber blanket, foil faces and unfaced, noncombustible in compliance with ASTM E84.
1. Johns Mansville, Industrial Insulation Group. "MinWool-1200"
 2. Rockwool Manufacturing Company Inc. "Roxul Safe".
 3. Thermafiber "Thermafiber Safing".
- B. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
1. Acceptable Manufacturers:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. RectorSeal.
 - d. Specified Technologies, Inc.
 - e. Tremco, Inc.
- C. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- D. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- E. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.

- F. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.

2.03 FILL, VOID, OR CAVITY MATERIALS

- A. Mortars Firestop Manufacturer and Type: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar, single component, noncombustible void seal in compliance with ASTM E814, UL Listed to include UL 1479.
 - 1. Proportions: Mix cementitious materials with water in compliance with safing manufacturer's instructions.
 - 2. Damming Material: Fiberglass or mineral wool.
 - 3. Acceptable Manufacturers:
 - a. Hilti "CP637 Firestop Compound",
 - b. Nelson Firestop Products, Inc. "CMP Firestop Compound",
 - c. The RectorSeal Corporation "Metacaulk Fire Stop Mortar",
 - d. The RectorSeal Corporation "K-10+ Firestop Mortar",
 - e. Specified Technologies, Inc. "SpecSeal SSM Firestop Mortar", or
 - f. Tremco, Inc. "TremStop M".
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Firestop Sealants Manufacturer and Type: One-part noncombustible intumescent void seal in compliance with ASTM E814 and UL listed to include UL 1479.
 - 1. Caulk; Gun Grade:
 - a. Hilti "FS One Max".
 - b. The RectorSeal Corporation "Metacaulk 1000 Firestopping Sealant".
 - c. Specified Technologies, Inc. "SpecSeal "LCI Intumescent Sealant".
 - d. 3M "Fire Barrier Caulk CP25WB+" and "Fire Barrier Caulk IC15WB".
 - e. Tremco Commercial Sealants & Waterproofing "IA".
 - f. BioFireshield "Biostop 500+ Firestop Sealant".

2. Putty; Knife Grade: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
 - a. Hilti, Inc. "CP618 Firestop Putty Stick".
 - b. Nelson Firestop Products, Inc. "FSP".
 - c. The RectorSeal Corporation "Metacaulk Fire Rated Putty".
 - d. Specified Technologies, Inc. "SpecSeal SSP Putty".
 - e. 3M "Fire Barrier Moldable Putty".
 - f. Bio Fireshield by RectorSeal Corporation "Biostop Fire Rated Intumescent Putty".
 - g. Tremco Commercial Sealants & Waterproofing "TremStop FP".

- F. Intumescent Pillows/Bags Manufacturer and Type: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
 1. The RectorSeal Corporation, "Biostop Firestop Pillows".
 2. Hilti, Inc. "CFS-BL Firestop Block".
 3. The RectorSeal Corporation, "Metacaulk Firestop Pillows".
 4. Specified Technologies, Inc. "SpecSeal SSB Intumescent Pillows".
 5. 3M "Fire Barrier Pillow Systems".
 6. Tremco Commercial Sealants & Waterproofing "TremStop PS".

2.04 ACCESSORY AND AUXILIARY COMPONENTS

- A. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- B. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- C. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- D. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.
- E. Damming Material: Mineral wool

2.05 MIXING

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

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.03 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.

- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.05 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- B. Where deficiencies are found or firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.06 CLEANING AND PROTECTION

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

END OF SECTION 07 8400

SECTION 07 9200
CAULKING AND SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
1. Silicone joint sealants.
 2. Nonstaining silicone joint sealants.
 3. Mildew-resistant joint sealants.
 4. Polysulfide joint sealants.

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
1. C 719 Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
 2. C 834 Latex Sealants.
 3. C 919 Use of Sealants in Acoustical Applications.
 4. C 920 Elastomeric Joint Sealants.
 5. C 1193 Guide for Use of Joint Sealants.
 6. C 1247 Test Methods for Durability of Sealants Exposed to Continuous Immersion in Liquids.
 7. C 1248 Test Method for Staining of Porous Substrate by Joint Sealants.
 8. D 1056 Flexible Cellular Materials – Sponge or Expand Rubber.
 9. E 90 Laboratory Measurement of Airborne-Sound Transmission Loss of Building Partitions and Elements.

1.04 DEFINITIONS

- A. Sealant: 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 water tight. Material is designed generally for application in exterior joints and for joints subject to movement.
- B. Caulking Compound: Material used in filling joints and seams, having properties of adhesion and cohesion; not required to have extensibility and recovery properties, generally for application in interior joints.
- C. Caulk: Process of filling joints, without regard to type of material.
- D. Joint Failure: Caulked joint exhibiting one or more of the following characteristics:
1. Air and/or water leakage.
 2. Loss of Adhesion.
 3. Loss of Cohesion.
 4. Migration.
 5. Failure to cure.

6. Discoloration.
7. Staining of adjacent work.
8. Development of bubbles, air pockets or voids.

1.05 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: Specifications, installation instructions, and general requirements of manufacturer of each type of sealant and associated miscellaneous materials required.
- C. Sustainable Design Submittals: Low-Emitting Materials: Provide cut sheet, with VOC content highlighted, for following:
 1. Each, adhesive, sealant and primer used on the interior of building.
- D. Samples: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view. Three, 1'-0" long samples of each color required for each type of sealant. Samples will be reviewed by Architect for color and texture only. Compliance with all other requirements is Contractor's responsibility.
- E. Qualification Data (FIO): For qualified testing agency.
- F. Compatibility and Adhesion Test Reports (FIO): Submit test reports from each kind of joint sealant manufacturer, for Architect's information, for tests performed by manufacturer and witnessed by a qualified testing agency indicating materials forming joint substrates and joint sealant backings have been tested in compliance with ASTM C719 for compatibility and adhesion with joint sealants. Indicate requirements for primers and special substrate preparation to meet adhesion requirements.
- G. Substrate Staining Test Results (FIO): Submit letter from sealant manufacturer for Architect's information indicating substrate stain testing has been performed in compliance with ASTM C1248, on actual samples of each type of stone and precast veneer to receive joint sealant, and that sealant was found to be non-staining to substrate. Indicate requirements for primer and special substrate preparation needed to meet non-staining requirements. Test substrate material in both wet and dry conditions.
- H. Certificates (FIO): Sealant manufacturer's certification that:
 1. Installer is approved by sealant manufacturer.
 2. On-site inspection was conducted, and sealants have been furnished and installed in compliance with this Section and are suitable for use intended.
- I. Sample Warranties (FIO): For special warranties.

1.06 QUALITY ASSURANCE

- A. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials for single manufacturer for each different product required for duration of Project.
- B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

- C. Testing:
1. Preconstruction Compatibility, Stain and Adhesion Testing: Submit samples of all materials that will contact or affect joint sealers to joint-sealant manufacturers for compatibility and adhesion testing as indicated below:
 - a. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates.
 - b. Schedule sufficient time for testing and analysis of results to prevent delay in progress of the Work.
 - c. Investigate materials failing compatibility or adhesion tests and obtain joint sealer manufacturer's written recommendations for corrective measures, including use of specially formulated primers.
 2. Product Testing: Provide comprehensive test data for each type of joint sealer based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Architect.
 - a. Test elastomeric sealants for compliance with requirements of ASTM C920. Include test results for hardness, stain resistance, adhesion and cohesion under cyclic movement in compliance with ASTM C719 and ASTM C1248, low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.
 3. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store materials in original, unopened containers.
- B. Store and handle materials to prevent contamination, water damage, and breakage of containers.

1.08 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
 5. Do not install caulking compound until building has been enclosed, is weathertight, and temperature is maintained at 40 deg F minimum.
 6. Complete caulking Work before final painting begins.

1.09 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Provide Owner written warranty that caulking and sealants will be free from faults and defects in materials and workmanship for period of two years for Date of Substantial Completion and that all defects occurring within said period shall be promptly corrected at no additional cost to Owner.

PART 2 - PRODUCTS

2.01 JOINT SEALANTS, GENERAL

- A. Materials, General:
 - 1. Colors of Exposed Joint Sealants: Selected by Architect from manufacturer's full range to match adjoining surfaces.
 - 2. Modulus of Elasticity: For joints subject to movement, either thermal expansion or dynamic movement, provide elastomeric sealants which have lowest modulus of elasticity which is consistent with exposure to abrasion and vandalism. Horizontal joints subject to traffic require sealants with high modulus of elasticity.
 - 3. Compatibility: Before purchase of each specified sealant, investigate compatibility with joint system. 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. Latex Joint Sealants:
 - 1. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF, nonstaining, nonbleeding, paintable caulk:
 - a. EverKem Diversified Products "Ecotex 25".
 - b. Pecora Corp. "AC-20+ Silicone".
 - c. Sherwin-Williams Company "950A Siliconized Acrylic Latex Caulk".
 - d. Tremco, Inc. "Tremflex 834".
- C. Butyl Joint Sealants:
 - 1. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.
 - a. Pecora Corp. "BC-158".
 - b. Sherwin-Williams Company "White Lightning Butyl Rubber Caulk".
 - c. Tremco, Inc. "Tremco Butyl Sealant".
- D. One-Part Neutral-Curing Silicone Sealant: ASTM C920, FS TT-S-00230C, Type S, Grade NS, Class 50, FS TT-S-001543A, Type II, Class A, One-part, medium modulus silicone rubber in colors selected by Architect.
 - 1. Masonry-to-Masonry Sealant with Open Cell Backer Rod:
 - a. Dow Corning Corp. "790".
 - b. Momentive, (GE Licensed Products) "SCS2700 SilPruf LM".
 - c. Pecora Corp. "890".
 - d. Sika "Sikasil WS-290".
 - e. Tremco Commercial Sealants & Waterproofing "Spectrem 1".

2. Masonry-to-Aluminum and Aluminum-to-Glass Sealant with Closed Cell Backer Rod:
 - a. Dow Corning Corp. "795".
 - b. Momentive, (GE Licensed Products) "SCS2000 SilPruf"
 - c. Pecora Corp. "895".
 - d. Sika "Sikasil WS-295".
 - e. Tremco Commercial Sealants & Waterproofing "Spectrem 2".

- E. Acoustical Sealant; Exposed: Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90 based on installation per ASTM C 919.
 1. Pecora Corp. "AIS-919" and "AVW-920".
 2. Sherwin-Williams Company "Powerhouse 1100A Siliconized Acrylic Latex Sealant".
 3. USG "Sheetrock Brand Acoustical Sealant".

- F. Acoustical Sealant; Concealed: Nonsag, nonhardening, nonskinning, nonstaining gunnable synthetic rubber sealant for sealing interior concealed joints to reduce transmission of airborne sound.
 1. Pecora Corp. "AIS-919".
 2. Sherwin-Williams Company "Powerhouse 1100A Siliconized Acrylic Latex Sealant".
 3. Tremco, Inc. "Tremco Acoustical Sealant".
 4. USG "Sheetrock Brand Acoustical Sealant".

- G. Interior Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth. Sanitary joints between plumbing fixtures, adjacent walls, floors, and counters.
 1. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - a. Dow Corporation Corp "DOWSIL 786 Silicone Sealant".
 - b. GE Construction Sealants; Momentive Performance Materials, Inc. "SCS1700 Sanitary".
 - c. Pecora Corporation "898NDT".
 - d. Tremco Inc. "Tremsil 200 Sanitary".

- H. One-Part Mildew Resistant, Nonstaining Silicone Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
 1. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - a. Dow Corning Corporation "786 Mildew-resistant Silicone Sealant".
 - b. GE Construction Sealants; Momentive Performance Materials, Inc. "SCS 1700 Silicone Sanitary Sealant".
 - c. Tremco, Inc. "THC-900" and "THC-901"

2.02 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: ASTM C 1330. Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Alcot Plastic Ltd.
 - b. BASF Corporation.
 - c. Construction Foam Products; a division of Nomaco, Inc.
- B. Cylindrical Sealant Backings: Type C (closed-cell material with a surface skin).
- C. Fire-Resistant Sealant Backings:
 - 1. Backer Rod Mfg. Inc. "Ultra Block".
 - 2. Tremco "Tremco FS Blanket".
 - 3. Williams Products, Inc. "Everlastic Dynashield Ceramic Fiber".
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.03 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Joint Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
- G. Do not proceed with installation of sealant over joint surfaces which have been painted, lacquered, waterproofed or treated with water repellent or other treatment or coating unless laboratory test for durability (adhesion) has successfully demonstrated sealant bond is not impaired by coating or treatment. If laboratory test has not been performed, or shows bond interference, remove coating or treatment from joint surfaces before installing sealant.

3.04 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.06 JOINT-SEALANT SCHEDULE

- A. Control joints and isolation joints between structure and other elements.
1. Sound sealed and air sealed joints.
 2. Joints at penetrations of walls, decks, and floors by piping and other services and equipment.
 3. Joints between concrete or masonry and other materials.
 4. Under thresholds.
 5. Between door frames and walls.
 6. Between Door frames and floor.
 7. Where partitions terminate at metal members.
 8. Each layer of multi-layer partitions.
 9. Interior joint in conjunction with vanities, fixtures, and tile finishes.

END OF SECTION 07 9200

SECTION 08 1113
HOLLOW METAL FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
 - 1. A653/A653M Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Zinc-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. A780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - 3. A1008 Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- B. American National Standards Institute (ANSI):
 - 1. A250.8 Recommended Specifications for Standard Steel Doors and Frames.
- C. National Fire Protection Association (NFPA):
 - 1. 80 Fire Doors and Fire Windows.
 - 2. 252 Fire Tests of Door Assemblies.

1.03 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.04 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.05 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: Manufacturer's data for fabrication and installation.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.
- C. Shop Drawings: Include the following:

1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 2. Locations of reinforcement and preparations for hardware.
 3. Details of each different wall opening condition.
 4. Details of anchorages, joints, field splices, and connections.
 5. Details of accessories.
 6. Details of conduit and preparations for power, signal, and control systems.
- D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.
- E. Product Test Reports (FIO): For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.
- D. Storage:
1. Store doors in upright position.
 2. Store in area well protected from inclement weather, dampness and excess humidity.
 3. Provide space between doors for air circulation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products, meeting specified quality and design standards for hollow frames, of following named manufacturers will be acceptable:
1. Ceco Door Products; an Assa Abloy Group Company.
 2. Curries Mfg., Inc.; an Assa Abloy Group Company.
 3. Mesker Door Inc.
 4. Republic Doors and Frames.
 5. Steelcraft, an Allegion Company.
 6. Windsor Doors.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.02 MATERIALS

- A. Frames: ASTM A1008, commercial quality cold-rolled steel; 16 gauge.
- B. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- C. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- D. Reinforcements: Internally reinforce doors and frames:
 - 1. Hinges: 7 gauge.
 - 2. Floor Checking Hinges and Pivots: 7 gauge.
 - 3. Locks, Closers, Push Plates, Pulls, Surface-Applied Hardware: 14 gauge.
 - 4. Mortar Guards over Lock Strikes and Hinge Reinforcements: 26 gauge.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- G. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.03 FRAME FABRICATION

- A. Construct frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified. Form frames of 16-gauge pressed sheet steel sections for interior frames full profile welded unit construction to indicated sizes, profiles and details. Miter corners and fully weld. Grind exposed welds smooth and invisible.
 - 1. Transom Bars, Mullions, Sidelite and Borrowed Lite Frames: Same material as door frames, joints welded and ground smooth. Fabricate in largest size sections allowed by shipping and installation restrictions. Field joints allowed only as indicated in approved shop drawings.
- B. Prepare door frames to receive specified finish hardware. Weld reinforcing plates to inner surface of frames for all hardware locations. Drill and tap for mortise hardware; use templates or physical samples for each item of hardware. Reinforce only for surface-applied hardware.
- C. Drill door frames for silencers. Refer to approved finish hardware schedule for frames requiring silencers and quantity per frame.
- D. Floor Anchors: Minimum 14-gauge thickness; securely welded inside each jamb, with two holes provided at each jamb for floor anchorage.
- E. Spot or tack weld removable spreaders to bottom of each door jamb to hold frames in true alignment during handling and installation.

- F. After fabrication, thoroughly clean and phosphatize frames. Apply one shop coat of manufacturer's standard rust-inhibiting primer paint to inside and outside frame surfaces.

2.04 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Walls: Adjustable, flat, corrugated or perforated T-shaped or stirrup-and-strap or wire type anchors; minimum 16-gauge steel or 0.156-inch diameter steel wire. Stirrup strap minimum 2-inches x 10-inches in size.
 - a. Frames to 7'-6" High: 3 anchors.
 - b. Frames 7'-6" to 8 Feet High: 4 anchors.
 - c. Frames Over 8 Feet High: One anchor per every 2 feet of frame height.
 - 2. Stud Partitions: Minimum 16-gauge thickness steel anchors of suitable design securely welded inside each jamb.
 - a. Frames to 7'-6" High: 4 anchors.
 - b. Frames 7'-6" to 8 Feet High: 5 anchors.
 - c. Frames Over 8 Feet High: 5 anchors plus one additional for each 2 feet over 8 feet.
 - 3. In-Place Masonry or Concrete: 3/8-inch countersunk, flat head, stove bolts in expansion shields, spaced 6-inches maximum from top and bottom of frame and at 2 feet on center maximum between.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
 - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.05 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. Install frames with removable stops located on secure side of opening.
 - b. Install door silencers in frames before grouting.
 - c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - d. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
 - 6. In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 7. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.04 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.

- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.
- F. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in Section 09 9000.

END OF SECTION 08 1113

SECTION 08 1416
FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 ACTION SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: For each type of door and finish.
 - 1. Include details of core and edge construction.
 - 2. Fire rated doors.
 - 3. Include factory-finishing specifications.
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- D. Samples:
 - 1. For each wood species and transparent finish, provide set of three Samples approximately 8 by 10 inches showing typical range of color and grain to be expected in finished Work.

1.03 INFORMATIONAL SUBMITTALS (FIO)

- A. Sample Warranty: For special warranty.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Certified for chain of custody by an FSC-accredited certification body.
- B. Vendor Qualifications: Certified for chain of custody by an FSC-accredited body.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons or cardboard cartons and wrap bundles of doors in plastic sheeting.

- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.07 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Marshfield-Algoma by Masonite Architectural are specified to indicate requirements for quality and appearance.
- B. Other Acceptable Manufacturers:
 - 1. Eggers Industries.
 - 2. Masonite.
 - 3. Oshkosh Door Company.
- C. Source Limitations: Obtain flush wood doors from single manufacturer.

2.02 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
 - 1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
- B. WDMA I.S.1-A Performance Grade:
 - 1. Extra Heavy Duty unless otherwise indicated.

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
2. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
3. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
4. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

D. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

1. Screw-Holding Capability: 550 lbf per WDMA T.M.-10.

2.03 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade AA faces.
2. Species: White Oak.
3. Cut: Plain sliced.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Center-Balance match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 10 feet or more.
8. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
9. Transom Match: Continuous match.
10. Exposed Vertical and Top Edges: Same species as faces or a compatible species - edge Type A.
11. Core: Structural composite lumber.
12. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.
13. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

B. Interior Solid Core Doors with Glazed Lites:

1. Match appearance grade and applicable construction and performance requirements of other standard veneer flush solid core wood doors.
2. Factory Glazing: Refer to Section 08 8000 – Glass and Glazing for glass view panels in flush wood doors. Factory install glass. Fill glazing bead nail holes in factory finished doors.
3. Wood Glazing Accessories: wood wrapped metal vision frames to match door veneer.

2.04 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
 - 1. Fabricate door and transom panels with full-width, solid-lumber meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.

2.05 SHOP PRIMING

- A. Doors for Transparent Finish: Shop prime faces and all four edges with stain (if required), other required pretreatments, and first coat of finish as specified in Section 09 9000. Seal edges of cutouts and mortises with first coat of finish.

2.06 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors where indicated in schedules or on Drawings as factory finished.
- C. Transparent Finish:
 - 1. Grade: Premium.
 - 2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" System 9, UV curable, acrylated epoxy, polyester, or urethane or System 11, catalyzed polyurethane.
 - 3. Staining: Match Architect's sample.
 - 4. Sheen: Satin.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Hardware: For installation, see Section 08 7100 Door Hardware.

- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
 - 2. Install smoke- and draft-control doors according to NFPA 105.

- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 - a. Comply with NFPA 80 for fire-rated doors.
 - b. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
 - 2. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

3.03 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.

- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 1416

SECTION 08 3113

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 REFERENCE STANDARDS

- A. American Architectural Manufacturers Association (AAMA):
1. AAMA 611-1998: Voluntary Specification for Anodized Architectural Aluminum.
- B. American National Standards Institute (ANSI):
1. H35.2/ H 35.2M Dimensional Tolerances for Aluminum Mill Products.
- C. American Society for Testing and Materials (ASTM):
1. A 36/A 36M Carbon Structural Steel.
 2. A153/A153M Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 3. A283/A283M Low and Intermediate Tensile Strength Carbon Steel Plates.
 4. A653/A653M Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 5. A666 Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 6. A786/A786M Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
 7. A793 Rolled Floor Plate, Stainless Steel.
 8. A879/A879M Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.
 9. A1008/A1008M Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 10. B209 Aluminum and Aluminum-Alloy Sheet and Plate.
 11. B221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 12. B632/B 632M Aluminum-Alloy Rolled Tread Plate.
 13. F2329 Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.
- D. National Fire Protection Association (NFPA):
1. 80 Fire Doors and Other Opening Protectives.
 2. 252 Standard Method of Fire Tests of Door Assemblies.
 3. 288 Standard Methods of Fire Tests of Floor Fire Door Assemblies Installed Horizontally in Fire Resistance-Rated Floor Systems.
- E. Underwriters Laboratories Inc. (UL):
1. 10B Fire Tests of Door Assemblies.

1.03 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: For each type of product.
 - 1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Manufacturer's technical data and installation instructions for each type access door.
- C. Samples: For each type of access door and frame and for each finish specified delivered to Project Site for Architect's approval, complete assembly minimum 6 by 6 inches in size. Provide samples when installed in public area locations, approved samples may be incorporated into Project.

1.04 QUALITY ASSURANCE

- A. Size Variation: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.
- B. Fire-Resistance Ratings: Wherever fire-resistance rating is required for construction in which access panels are to be installed, provide assembly of type and manufacturer listed by Underwriter's Laboratories, "Classified Building Materials Index". Provide UL label on each fire-resistance rated access panel assembly.
- C. Affected trades are to purchase and install access doors and frames into material where access door and panel is to be located. Review locations with Architect prior to installation.
 - 1. Finish: Selected by Architect to match adjacent finish materials.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

2.02 ACCESS DOORS AND FRAMES

- A. Recessed Access Doors with Concealed Flanges: Basis-of-Design: Bauco "BP-58 Bauco Plus II", with touch latch.
 - 1. Acudor Product Inc. "DW- 5058".
 - 2. Babcock-Davis "BRGB".
 - 3. Nystrom, Inc. "RGB".
 - 4. Description: Door face recessed 1/2 inch gypsum board infill; with concealed flange for gypsum board or no bead for acoustical tile installation and concealed hinge.
- B. Flush Access Doors with Tapered Flanges (Non-Rated General Purpose Access Door):
 - 1. Acudor Products, Inc. "UF-5500".
 - 2. Babcock-Davis "BNT".
 - 3. J.L Industries, Inc. "TM".
 - 4. Nystrom, Inc. "NT Architectural"
 - 5. Description: Face of door flush with frame, with 1-inch exposed flange and concealed hinge. Screwdriver Cam Latch. Powder coat finish for field painting. Provide masonry screws.

2.03 FIRE-RATED ACCESS DOORS AND FRAMES

- A. Fire-Rated, Flush Access Doors with Concealed Flanges:
 - 1. Acudor Products, Inc. "FW-5050-DW".
 - 2. Babcock-Davis "IWK".
 - 3. J.L Industries, Inc. "FDW".
 - 4. Nystrom, Inc. "IWK"
 - 5. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal uninsulated; with exposed flange for gypsum board installation, self-closing door, and continuous piano hinge.

2.04 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.
- E. Aluminum Extrusions: ASTM B 221, Alloy 6063.
- F. Aluminum Sheet: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- G. Frame Anchors: Same material as door face.
- H. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.05 FABRICATION

- A. General:
 - 1. Provide access door and frame assemblies manufactured as integral units complete with frames, door panels, hardware and anchors, ready for installation.
 - 2. Fabricate units of continuously welded steel construction unless indicated otherwise in Drawings. Grind exposed welds smooth and flush with adjacent surfaces.
 - 3. Provide attachment devices, anchors and fasteners of type and sizes required to secure access doors to types of supporting construction.
 - 4. Provide sleeved and grommeted screwdriver operated cam locks in nonpublic areas and provide key operated flush cylinder locks for doors in public areas. Key all locks alike and furnish two keys per lock. Provide interior latch release on all doors used for man-access. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- C. Doors and Frames:
 - 1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
 - 2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded-metal lath and exposed casing bead welded to perimeter of frames.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
- E. Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.06 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
 - 2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of 1 mil for topcoat.
 - a. Color: As selected by Architect from full range of industry colors.
- E. Stainless-Steel Finishes:
 - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
 - 2. Polished Finish: No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - a. Run grain of directional finishes with long dimension of each piece.
 - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.03 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 08 3113

SECTION 08 7100

DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 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. Push/Pull units
 - 3. Closers
 - 4. Miscellaneous door control devices
 - 5. Door trim units
 - 6. Protection plates
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 07 9200: Joint Sealants
 - 2. Section 08 1400: Wood Doors
 - 3. Section 08 4113: Aluminum-Framed Entrances and Storefronts
- 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.

1.03 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.

1.04 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. 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.
- C. 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.
- D. 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.
- E. 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.

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

1.05 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 detailer 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. Require 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 7-2 (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.

1.06 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.

1.07 WARRANTY

- A. Special warranties:
 - 1. Hinges: Lifetime
 - 2. Door Closers: Ten year period

1.08 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

2.01 MANUFACTURED UNITS

(* Denotes manufacturer referenced in the Hardware Headings)

- A. Hinges:
 - 1. Acceptable manufacturers:
 - a. Bommer
 - b. Hager Hinge Company
 - c. PBB*
 - 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. Cylinders:
 - 1. Acceptable manufacturers:
 - a. Best Access Systems* CorMax Patented Keying
 - 2. Characteristics:
 - a. Existing System: Grand master key the locks to the Owner's existing Patented system, with a new master key for the Project. Cylinders for

- custodial, data, mechanical and electrical rooms to accept Best standard cores.
- b. Furnish final cores and keys for installation by Owner. Construction cores are furnished and installed as part of the Contract.
 - c. 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. Coordinate and document a meeting with the Best Access Systems representative, the Georgia Tech Facilities Lockshop to coordinate a final keying schedule. Prepare the final keying schedule based on that meeting to clearly indicate how Owner's final instructions on keying of locks has been fulfilled and submit it as part of the hardware submittal process.
 - 1) Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
 - d. Provide construction keying for use during construction period. After Date of Substantial Completion, void construction keying with Owner's permanent keying.
 - e. Key Material: Provide keys of nickel silver only.
 - f. Key Quantity: Furnish 3 change keys for each lock.
 - g. Deliver to Owner a "Certificate and Receipt" worded as follows:

CERTIFICATE AND RECEIPT

This will certify (a) that the permanent cores for the doors designated in the contract documents for Project No. _____ on the campus of _____ were delivered to the comptroller of the said Institution on _____, 20__; that (b) all keys for permanent cores called for in the aforesaid contract documents were delivered to the aforesaid comptroller on the same date; and that (c) by reason of the fact that the cost of the aforesaid permanent cores and the aforesaid keys for the aforesaid permanent cores were included in the cost of the Best mortise cylinders (consisting of cylinder housing and construction core), no additional charge has been made or will be made by Best Access Systems against the Contractor, any subcontractor, the Owner, or the Institution for the aforesaid permanent cores or the aforesaid keys for the aforesaid permanent cores. This certificate is furnished in consideration of \$1.00 and other good and valuable consideration the receipt of which is hereby acknowledged.

This _____ day of _____, 20__.

Best Access Systems

BY: _____
Factory Representative

This receipt, made on behalf of the _____ will acknowledge receipt of the permanent cores and the keys to the said permanent cores as referred to in the above certificate of BEST ACCESS SYSTEMS.

Comptroller, _____

- C. Locksets, Latchsets, Deadbolts:
1. Acceptable manufacturers:
 - a. Best 45H Series*
 - b. Sargent 8200 Series
 - c. Schlage L9000 Series
 2. Mortise locksets and latchsets:
 - a. Chassis: cold-rolled steel, handing field-changeable without disassembly.
 - b. Latchbolts: 3/4-inch throw stainless steel antifriction type.
 - c. Lever Trim: through-bolted, accessible design, cast or solid rod lever as scheduled. Tactile warning on levers into hazardous spaces.
 - d. Spindles: independent breakaway.
 - e. Deadbolts: stainless steel 1-inch throw.
 - f. Electric operation: Manufacturer-installed continuous duty solenoid.
 - g. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
 - h. Plastic thumbturns are prohibited.
 - i. Lock Series and Design: Best 45H Series, 15H design.
 - j. Certifications:
 - 1) ANSI A156.13, 1994, Series 1000, Grade 1 Operational, Grade 2 Security.
 - 2) UL listed for A label single doors up to 4 ft x 8 ft.
- D. Overhead Stops and Holders:
1. Acceptable manufacturers:
 - a. ABH Manufacturing*
 - b. Glynn Johnson
 2. Types: as indicated in hardware headings
- E. Silencers:
1. Acceptable manufacturers:
 - a. Burns*
 - b. Ives
 - c. Rockwood Manufacturing
 2. Three for each single doors; four for pairs of doors.

2.02 MATERIALS AND FABRICATION

- A. 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.
- B. 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. Self-tapping screws are not an acceptable installation method.
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. 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 fastener.

2.03 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 or 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 (Interior doors): 652 (US26D) Satin Chrome Plated Steel
 2. Mortise Locksets: 630 (US32D) Satin Stainless Steel
 3. Overhead Stops: 626 (US26D) Satin Chrome Plated Brass/Bronze

PART 3 - EXECUTION

3.01 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.
- 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. Where both floor stops and wall stops are specified in headings, select the proper stop based upon conditions at each opening in that heading. Use a floor stop only when conditions would prohibit using a wall stop.
- F. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Section 07 9200 Joint Sealers.
- G. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.02 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.

3.03 HARDWARE SCHEDULE

HEADING #1

EACH DOOR TO HAVE:

3	HINGES	BB81
1	LOCKSET	45H7A
1	OVERHEAD STOP	4420 SERIES

HEADING #2

EACH DOOR TO HAVE:

1	LOCKSET	45H7A
1	WRAP AROUND ADAPTER PLATE	AS CONDITIONS REQUIRE

NOTE: EXISTING DOOR AND BALANCE OF HARDWARE TO REMAIN
VERIFY TYPE OF EXISTING PREP IN DOOR AND FRAME; COORDINATE WITH
CONDITIONS
USE A WRAP AROUND ADAPTER IF EXISTING PREPS WILL NOT ACCEPT NEW
LOCKSET, TYPE AS CONDITIONS REQUIRE

END OF SECTION

SECTION 08 8000
GLASS AND GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional requirements.

1.02 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI):
 - 1. Z97.1 Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test.
- B. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):
 - 1. 7 Minimum Design Loads for Buildings and Other Structures.
- C. American Society for Testing and Materials (ASTM):
 - 1. C1036 Flat Glass.
 - 2. C1048 Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
 - 3. C1172 Laminated Architectural Flat Glass.
 - 4. E1300 Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load.
 - 5. E2190 Insulating Glass Unit Performance and Evaluation.
- D. Code of Federal Regulations (CRF):
 - 1. 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
- E. Glass Association of North America (GANA):
 - 1. Glazing Manual.
 - 2. Sealant Manual.

1.03 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.
- C. IBC: International Building Code.

1.04 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.05 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: For each type of product.
- C. Glass Samples: For each type of the following products; 12 inches square.
 - 1. Laminated glass, including interlayer to show edge detail.
 - 2. Interlayer: Provide full height sample, 3 feet in length showing full pattern to match Architects sample.
- D. Glazing Accessory Samples: For sealants, in 12-inch lengths.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Calculations; (FIO): Submit calculations prepared by glazing material manufacturer indicating recommendations for glass thickness and heat treating of glazing materials. Identify factors affecting breakage probability which have been taken into consideration and include breakage probability of 8 lites per 1000 lites for vertical glazing.
- G. Qualification Data (FIO): For Installer and glass testing agency.
- H. Sample Warranties (FIO): For special warranties.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- C. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.09 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written

instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Ten (10) years from date of Substantial Completion.
2. Laminated Units: No manufacturing defects resulting in edge separation or material obstruction of vision through glass surface; 5 years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers/Fabricators: Subject to compliance with all requirements of this specification, provide named products and systems or comparable products and systems by one of following manufacturers:
 1. Float Glass:
 - a. AGC Glass Company North America.
 - b. Guardian Industries Corp.
 - c. PPG Industries, Inc.
- B. Acceptable Fabricators:
 1. AIG; American Insulated Glass.
 2. Insulite Glass, Inc.
 3. Nashville Tempered Glass.
 4. Oldcastle Building Envelope.
 5. On-Site Systems.
 6. Tristar Glass
 7. Trulite Glass & Aluminum Solutions, LLC.
- C. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- D. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.02 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 - Quality Requirements, to design glazing for tempered glass railing assemblies.
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E1300.
- D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.03 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."

- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than 3/8" thickness.
- D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.
- E. Glass Types: Thicknesses and heat-strengthening or tempering as determined by glass manufacturer to meet the load requirements.
 - 1. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
 - 2. Ultraclear Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality -Q3; and with visible light transmission of not less than 91 percent.
 - 3. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.
 - 4. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 - 5. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - a. Construction: Laminate glass with frosted polyester film as specified herein to comply with interlayer manufacturer's written instructions.
 - b. Basis-of-Design Interlayer Manufacturer: Solyx "SXJ-0547 Feather Gradient". Frosted polyester film with a translucent gradually fading gradient background effect in custom gradient, and properties to meet Project requirements.
 - c. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
- F. Glazing Materials: Subject to compliance with requirements of this specification, provide named products and systems or comparable products and systems by one of following manufacturers:
 - 1. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
 - a. Glazing: Dow Corning "795", Pecora Corp. "895", or Tremco Commercial Sealants & Waterproofing "Spectrem 2".
 - b. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 - c. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 - d. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
 - 2. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
 - 3. Setting Blocks: ASTM C864, EPDM, 80-90 Shore A durometer hardness, minimum 4-inches long, with proven compatibility with glazing sealant.
 - a. Type recommended by sealant or glass manufacturer.
- G. Spacers: ASTM C864, EPDM, 40-50 Shore A durometer hardness, with proven compatibility with glazing sealant.

1. Type recommended by sealant or glass manufacturer.
- H. Edge Blocks: ASTM C864, EPDM, 50-60 Shore A durometer hardness, with proven compatibility with glazing sealant.
 1. Type recommended by sealant or glass manufacturer.
- I. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.04 FABRICATION

- A. Factory fabricate tempered glass to exact sizes and dimensions required. Fabricate all tempered glass using horizontal process.
 1. Do not attempt to alter, modify or cut tempered glass in field.
 2. Furnish tempered glass with Safety Glazing Certification Council monogram.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.
- D. Fabricate laminated units with edges autoclaved. No cut edges allowed.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 2. Presence and functioning of weep systems.
 3. Minimum required face and edge clearances.
 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.03 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge

- damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
 - D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
 - E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
 - F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
 - G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
 - H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
 - I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
 - J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
 - K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 INSTALLATION

- A. Install glass in compliance with manufacturer's product data and with instructions contained in GANA's Glazing Manual. Use workmen specialized in application of glass and sealants and apply glazing compound in compliance with manufacturer's recommendations.
- B. Install setting blocks for all glazing materials over six square feet in area. Install at sill rabbet at quarter points. Size setting blocks in proportion to glass weight; minimum 4-inch length.
- C. Shim all lites over 100 united inches in framed glazed systems, inboard and outboard, on all sides using continuous shims, except where gaskets accomplish shimming.
- D. Provide edge blocks, minimum 3-inch length, at vertical jambs to prevent lateral movement of glass. Install filler rods in channel at heel of jambs and head. Maintain 1/8-inch clearance between edge of glass and edge block.

- E. Apply glazing sealants under pressure with hand or power actuated gun or other appropriate means. Use gun having nozzle of proper size and provide sufficient pressure to completely fill joint. Neatly point or tool all joint surfaces to provide proper contour.
- F. Force glazing compound into channel to eliminate voids and to ensure complete bonding to glass and channel surfaces.
- G. Tool exposed surfaces of glazing sealants to provide a wash away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel so as to eliminate dirt and moisture pockets. Install horizontals first, followed by verticals. Roll into place.

3.05 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 08 8000

SECTION 09 2116

GYPSUM BOARD WALL ASSEMBLIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional requirements in 092000 - Gypsum Board Assemblies.

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
 - 1. A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. A 1003 Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
 - 3. B 221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 4. C 475 Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - 5. C 641 Test Method for Iron Staining Materials in Lightweight Concrete Aggregates.
 - 6. C 645 Standard Specification for Nonstructural Steel Framing Members.
 - 7. C 665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 8. C 754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 9. C 840 Standard Specification for Application and Finishing of Gypsum Board.
 - 10. C 919 Standard Practice for Use of Sealants in Acoustical Applications.
 - 11. C 1002 Standard Specification for Steel Self Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - 12. C 1396 Standard Specification for Gypsum Board.
 - 13. E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 14. E 90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 15. E 119 Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 16. E 413 Classification for Rating Sound Insulation.
 - 17. E 488 Test Methods for Strength of Anchors in Concrete Elements.
 - 18. E 1190 Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members
- B. American Iron and Steel Institute (AISI):
 - 1. S100 "North American Specification for the Design of Cold-Formed Steel Structural Members."
 - 2. S240 "North American Standard for Cold-Formed Steel Structural Framing."

- C. Gypsum Association (GA):
 - 1. 214 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. 216 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 3. 238 Guidelines for the Prevention of Mold Growth on Gypsum Board; Gypsum Association.
 - 4. 600 Fire Resistance Design Manual.
- D. ICC Evaluation Service, LLC (ICC-ES):
 - 1. AC70 Fasteners Power-Driven into Concrete, Steel and Masonry Elements.
 - 2. AC193 Mechanical Anchors in Concrete Elements.
- E. Underwriters Laboratory (UL) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.03 SYSTEM DESCRIPTION

- A. Design steel in compliance with American Iron and Steel Institute Publication S100 "North American Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Design Criteria: Design and construct interior wall and partitions, except as may be specifically indicated otherwise; for a maximum allowable deflection of L/240, except L/360 for walls and partitions where finish on the room side is, tile, or wood panels; L equals to height in inches when subjected to uniformly distributed horizontal loads as scheduled herein:
 - 1. Typical Interior Partitions: 5 PSF, minimum design lateral load is required for interior walls by the building code.
- C. Design framing system to accommodate deflection of primary building structure and construction tolerances.
- D. Design and install partitions and furring with maximum 1/8-inch in 12 feet noncumulative variance from plumb and true.

1.04 ACTION SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: Manufacturer's data sheets on each product specified, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Manufacturer's certification of product compliance with codes and standards.
- C. Shop Drawings: Submit plans, elevations, sections, details and reflected ceiling plans for wall and ceiling system. Include dimensions, materials, gauges, reinforcement and expansion joint details, sound control details, load capacity and installation instructions.
- D. Samples: For reveal provide three samples, minimum size 6 inches in length, representing actual product.

1.05 QUALITY ASSURANCE

- A. Single Source Responsibility:
 - 1. Panel and Panel Accessories: Obtain each type of gypsum board and any related joint treatment materials from single manufacturer.
 - 2. Steel Framing and Accessories: Obtain steel framing members for gypsum board assemblies from single manufacturer.
 - 3. Finish Materials: Obtain finishing materials from same manufacturer of gypsum board or from single manufacturer acceptable to gypsum board manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver packaged materials in manufacturer's original, unopened containers bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and support them on risers on a flat platform to prevent sagging.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations; General: Maintain environmental conditions (temperature, humidity, and ventilation) for application and finish of gypsum board to comply with ASTM C 840 and gypsum board manufacturer's recommendations.
- B. Do not install panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-structural steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by, and displaying a classification label, from an independent testing agency acceptable to Authority Having Jurisdiction.
 - 1. Construct fire-resistance-rated partitions in compliance with tested assembly requirements indicated on the Drawings.
 - 2. Rated assemblies to be substantiated from applicable testing using the proposed products, by Contractor.
- B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assemblies tested in compliance to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency.

2.02 ACCEPTABLE MANUFACTURERS

- A. Basis-of-Design Manufacturer; Gypsum Board: Except as otherwise specified, products of USG Corporation are named to establish quality and design standards for gypsum board materials.
 - 1. Other Acceptable Manufacturers: Subject to compliance with requirements of this specification, provide named products and systems or comparable products and systems by one of the following manufacturers:
 - a. CertainTeed Corporation.
 - b. Continental Building Products, LLC
 - c. Georgia-Pacific Gypsum LLC.
 - d. National Gypsum Company.

- B. Basis-of-Design Manufacturer; Direct Suspension System: Except as otherwise specified, products of USG Corporation are named to establish quality and design standards.
 - 1. Other Acceptable Manufacturers: Products of following manufacturers will be acceptable provided systems meet UL, SBBCCI, and UBC requirements and all requirements of this specification:
 - a. Armstrong World Industries.
 - b. CertainTeed Ceilings.

- C. Basis-of Design Manufacturer; Steel Framing and Furring System: Except as otherwise specified, products of Clark Dietrich Building Systems are named to establish quality and design standards for steel framing and furring materials.
 - 1. Other Acceptable Manufacturers: Subject to compliance with requirements of this specification, provide named products and systems or comparable products and systems by one of the following manufacturers:
 - a. Cemco
 - b. Marino/WARE.

2.03 METAL FRAMING COMPONENTS

- A. Recycled Content of Steel Products: Post-consumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

- B. Framing Members, General: Comply with ASTM C 645 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Comply with ASTM C 645; ASTM A 653/A 653M G40 (Z120), Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120); roll-formed from steel meeting mechanical and chemical requirements of ASTM A 1003 with a zinc-based coating. A40 galvanized products are not acceptable.
 - a. Coatings shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authority having jurisdiction.

- C. Steel Struts and Runners: ASTM C 645. Sizes indicated and gauges required to suit various clear-span conditions.
 - 1. Non-Structural Studs: "ProSTUD" Cold-formed galvanized steel C-studs.
 - 2. Non-Structural Track: "ProTRAK" Cold-formed galvanized steel runner tracks.
 - a. Flange Size: 1-1/4 inch (32 mm).
 - b. Web Depth: Track web to match stud web size.
 - c. Minimum Base-Steel Thickness: Track thickness to match wall stud thickness or as per design.

- D. Slotted Deflection Track: "MaxTrak" or "BlazeFrame" Cold-formed galvanized steel.

- E. Furring Channel: Cold-formed galvanized steel.
- F. U Channel: Cold-formed galvanized steel.
- G. H Studs and C-Runner: Cold-formed galvanized steel.
- H. CT Shaftwall Studs and J-Tabbed Track: Cold-formed galvanized steel.
- I. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - 1. Acceptable Manufacturers:
 - a. Cemco.
 - b. ClarkDietrich.
 - c. GCP Applied Technologies, Inc.
- J. Framing Component Accessories: Provide accessories as required for a complete system.
- K. Wire: ASTM A641, Class 1 zinc coating, soft temper.
 - 1. Hangers: 12 gauge; 0.162-inch diameter.
 - 2. Ties: 16 gauge; 0.062-inch thick.
- L. Fasteners: Drywall screws, "Type S" and "Type G" bugle head, for power installation, ASTM C1002; cadmium-plated for "wet-wall" locations.

2.04 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with wall manufacturer's written instructions.
- B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes that comply with gypsum board wall assembly manufacturer's written instructions for application indicated.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
- D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
 - 1. 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.
 - 2. 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.
- E. Reinforcing: Galvanized-steel reinforcing strips with 0.033-inch minimum thickness of base metal (uncoated).
- F. Gypsum Board Cants:
 - 1. Gypsum Board Panels: As specified herein, Type X, 1/2- or 5/8-inch panels.
 - 2. Adhesive: Laminating adhesive as specified herein.
 - 3. Non-Load-Bearing Steel Framing: As specified herein "Non-Structural Metal Framing."

2.05 GYPSUM BOARD, GENERAL

- A. **Recycled Content:** Postconsumer recycled content plus one-half of preconsumer recycled content not less than 10 percent.
- B. **Size:** Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.06 GYPSUM BOARD

- A. **Standard Board:** USG "Sheetrock", ASTM C1396/C1396M, tapered edges, 48-inches wide x thickness indicated, in maximum lengths to minimize end-to-end butt joints. Sag-resistant type for ceiling surfaces.
- B. **Fire-Resistant Board:** USG "Sheetrock Firecode Core" and "Sheetrock Firecode UCU Core", ASTM C1396 Type X, tapered edges, thickness indicated.
- C. **Shaft Walls:** G-P Gypsum, a Georgia-Pacific company "DensGlass Shaftliner", C1658, C1396, Type X, 1-inch thick x width and length indicated, double beveled edges.
- D. **Moisture Resistant Board:** National Gypsum Company "Gold Bond Brand XP Gypsum Board", ASTM D3273, tapered edges, 48-inches wide x thickness indicated, mold and mildew resistant, purple in color. Other Acceptable Manufacturer:
 - 1. USG "Sheetrock Mold Tough", "Sheetrock Mold Tough Firecode", or "Sheetrock Mold Tough Firecode UCU", ASTM D3273, tapered edges, 48-inches wide x thickness indicated.
- E. **Glass-Mat, Water-Resistant Backing Board:** G-P Gypsum, a Georgia-Pacific company "DensShield Tile Backer", ASTM C1658/C1658M, incombustible and water-resistant gypsum core with water-repellent glass fiber mat face weighing 1900 lbs./1000 sf; 4U-0" wide x 8U-0" or 10U-0" long; square ends, 5/8-inch thick, Type X core.

2.07 GYPSUM BOARD ACCESSORIES

- A. **Adhesives:** ASTM C475, USG "Durabond Joint Compound".
- B. **Reinforcing for Thru Wall Mounted Items:** Minimum 18 gauge galvanized sheet metal, 12-inches wide and spanning minimum 2 studs, or treated wood blocking specified in Section 06 1000.
- C. **Control Joint:** USG "#093" or ClarkDietrich "#93" control joint, roll-formed zinc with 1/4-inch wide x 7/16-inch deep tape protected opening.
- D. **Corner Beads:**
 - 1. USG "Dur-A-Bead No. 103" or ClarkDietrich "103 Deluxe Bead": 1-1/4 inch all metal, hot-dipped galvanized reinforcement for external corners; mechanically attached.
 - 2. USG "Corner Bead #800" or Clark Dietrich "Mini-Bead 800": 1-1/4 inch galvanized fine-mesh expanded flanges; mechanically attached.
- E. **Edge Trim:** Galvanized steel; mud-in type for finishing with joint compound.
 - 1. USG "200-A" or ClarkDietrich "M20A" metal trim, U shaped.
 - 2. USG "200-B" or ClarkDietrich "M20B", metal trim, L shaped.

- F. Decorative Reveal: Aluminum extruded trim; Fry Reglet "VPR-375-375 Model" Drywall/Veneer plaster reveal molding; 3/8-inch. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, Alloy 6063-T5.
 - 1. Finish: White.
- G. Joint Compound: Comply with requirements of ASTM C475.
 - 1. USG "Sheetrock Brand Plus 3 Joint Compound" for all interior installation locations exposed to moisture and high humidity.
 - 2. USG "Ready-Mixed Compounds".
 - 3. Other Acceptable Manufacturer: G-P Gypsum, a Georgia-Pacific company.
- H. Tape; Typical Interior Conditions: ASTM C475, USG "SHEETROCK Brand Heavy Joint Tape" or G-P Gypsum, a Georgia-Pacific company "ToughRock Tape".
- I. Sealant: Specified in Section 07 92 00.

2.08 ACOUSTICAL MATERIALS

- A. Sound Attenuation Blankets and Sound Attenuation Fire Blankets: ASTM C 665, Type I, paperless semi-rigid mineral-fiber blankets, thickness indicated. Surface burning characteristics per ASTM E 84; Flame spread of 15 or less. Smoke developed of 0. Produced by combining fibers manufactured from glass, slag wool, or rock wool as manufactured by one of the following:
 - 1. CertainTeed.
 - 2. Johns Manville, Inc.
 - 3. Owens Corning.
 - 4. Roxul, Inc.
 - 5. Thermafiber LLC.
- B. Acoustical Sealant: Specified in Section 07 9200.
- C. Acoustical Tape: Closed cell polyvinyl chloride foam take 1/4-inch thick x one-inch wide.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 METAL FRAMING INSTALLATION

- A. Install cold-formed framing in compliance with requirement of ASTM C 754.

B. Framing Installation:

1. Accurately place top and bottom runners, track and headers and securely attach metal studs in correct position so finished work will be sturdy, plumb and true-to-line. Space metal studs on centers indicated except where good practice requires closer spacing. Space metal studs on 16-inch centers for all partitions to receive tile finishes.
 - a. Extend metal studs from floor to overhead construction except where indicated to stop at ceiling line.
2. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown in Drawings and following:
 - a. Where building structure abuts ceiling perimeter or penetrates ceiling.
 - b. Where partition framing and wall furring abut structure, except at floor.
3. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
4. Where partitions abut walls, columns, window wall framing and other partitions, apply continuous strip of acoustical tape between runner and structure.
5. Where studs are installed directly against exterior walls, install building felt strips between studs and wall.
6. At indicated partitions, seal each side of partition with acoustical sealant as recommended by manufacturer and specified herein, except fire rated partitions, which shall be firestopped in compliance with Section 07 84 00.
7. At control joints, install double studs attached to runner and track with 1/2-inch between studs.
8. Handle and lift prefabricated panels in a manner to not cause distortion in any member.
9. Anchor runner track securely to the supporting structure. Install concrete anchors only after full compressive strength has been achieved.
10. Butt all track joints. Securely anchor abutting pieces of track to a common structural element, or splice them together.
11. Align and plumb studs, and securely attach to the flanges or webs of both upper and lower tracks.
12. Attach wall stud bridging when required in a manner to prevent stud rotation. Space bridging rows according to manufacturer's instructions.
13. Provided temporary bracing until erection is completed.
14. Where indicated in Drawings, provide for structural vertical movement using means in compliance with manufacturer's instructions.

C. Drywall Penetration Barrier Mesh Installation:

1. Barrier Mesh sheets may be installed with diamond running in direction most suitable.
2. BM-Clips shall be installed to secure the mesh to the framing members.
3. Mesh joints occurring on framing members may either join staggered or butt together.
4. It is acceptable to overlap mesh joints to achieve tie-in.
5. BM sheets shall join, begin and terminate on a framing member.
6. BM sheets not joining on framing member shall be wire tied with 18GA steel tie wire.
7. Wire tying shall be no less frequent than the installation of Mesh Clips.

D. Wall Furring Installation:

1. Erect wall furring as framed construction using 3-5/8 inch metal studs to facilitate power, data communication and future rewiring. Brace studs to primary wall structure for stiffness.
2. Erect furring channels vertically. Space furring channels maximum 2 feet on center, not more than 4-inches from floor and ceiling lines and abutting walls.

- E. Ceiling Framing Installation:
1. Coordinate location of hangers with other work to support ceiling loads.
 2. Install ceiling framing independent of walls, columns, and above-ceiling work. Sizes, locations and spacings of hangers, main runner channel, furring channels and attachments to be in compliance with ASTM C754.
 3. Direct Suspension System: Install for suspended gypsum board ceilings. Secure #12 gauge hanger wire (pigtail knot) to underside of structure above in approved method.
 - a. Install 1-5/8 inch wall track on perimeter wall 12-inches on center with proper components to receive tees, and screw attach gypsum board in proper ceiling level.
 - b. Support main beams and cross tees with hanger wire 2 feet, 3 feet or maximum 4 feet apart on tees. Align route holes in main runner to accommodate cross tees. Engage ends of main beams to fit securely.
 - c. Secure cross tees perpendicular to main beams at maximum 1'-4" on centers.
 - d. Install cross beams or wire to support light fixtures or ceiling grille in place loads.
 - e. Use drywall clips as necessary to complete ceiling design integrating with gypsum board grid components.
 4. Conventional Grillage System: May be used at Contractor's option.
 - a. Suspend carrying channels maximum 4 feet on center from hanger wires.
 - b. Secure metal furring channels to carrying channels at maximum 1'-4" on centers with tie wires.

3.03 GYPSUM BOARD INSTALLATION

- A. Gypsum Board:
1. Gypsum Board Application and Finishing Standards: Comply with ASTM C 840 and GA-216, except where more stringent requirements are specified.
 2. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
 3. Install ceiling boards across framing in manner which minimizes number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints a minimum of 24 inches.
 4. Install wall and partition boards horizontally or vertically to metal studs and metal furring channels with vertical joints staggered.
 5. Install exposed gypsum board with face side out. Do not install imperfect, damaged, or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards.
 6. Locate either edge or end joints over supports, except in horizontal applications or where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges, and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
 7. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
 8. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cut-outs.
 9. Form control joints and expansion joints at locations indicated on Drawings, and as recommended by Gypsum Association, with space between edges of boards prepared to receive trim accessories.
 10. Cover both faces of steel stud partition framing with gypsum board in concealed spaces except in chase walls that are properly braced internally.
 11. Attach gypsum board to receive tile with drywall screws spaced 12-inches on center. Attach gypsum board to receive tile thicker than 5/16-inch with drywall screws spaces 8-inches on centers.

12. Where partition continuous to structure, continue tape and floating.
 13. Fit gypsum board around ducts, pipes, and conduits.
 14. Where partitions intersect open concrete coffers, cut gypsum board to fit profile of coffers and allow 1/4 to 1/2-inch wide joint for sealant.
 15. Isolate perimeter of non-load bearing drywall partitions at structural abutments. Provide 1/4 to 1/2-inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant as specified in Section 07 9200.
 16. Where sound-rated drywall construction is indicated on Drawings, seal construction at perimeters, control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's instructions for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.
 17. Space fasteners in gypsum boards per referenced gypsum board application and finishing standard and manufacturer's recommendations.
- B. Accessories:
1. Where feasible, use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports. Otherwise, fasten flanges to comply with manufacturer's instructions.
 2. Install metal corner beads at external corners.
 3. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, except where plastic trim is indicated on Drawings. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.
 4. Install gypsum board reveals where indicated on Drawings.
 5. Install control joints in compliance with ASTM C 840 at locations indicated on Drawings, or if not indicated, at spacing and locations required by referenced gypsum board application and finish standard, and approved by Architect for visual effect.
 - a. Distance between control joints in wall or wall furring shall not exceed 30'-0".
 - b. Install in partitions, walls and wall furring runs exceeding 30'-0".
 - c. Full height wall or partition door frames may be considered a control joint.
 6. Apply foam closure strip where partition abuts glass.
- C. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8-inch in 10 feet in any directions.
- D. Gypsum Board Finish Levels: Finish panels to level indicated below, in compliance with ASTM C 840 for locations indicated:
1. Level 1: Embed tape/mesh at joints in concealed ceiling plenums, service corridors; above ceilings, concealed areas, and where indicated.
 2. Level 2: Embed tape/mesh and apply separate first coat of joint compound to tape/mesh, fasteners, and trim flanges where panels are water resistant gypsum backing board under tile; exposed areas where appearance is not critical.
 3. Level 3: Embed tape/mesh and apply separate first coat of joint compound to tape/mesh, fasteners, and trim flanges for panels exposed to view to receive heavy or medium textured coatings; heavy-grade wall coverings.
 4. Level 4: Embed tape/mesh and apply separate first coat of joint compound to tape/mesh, fasteners, and trim flanges at panels surfaces exposed to view to receive flat sheen, semi-gloss and gloss paint finish; light textured coatings; lightweight wall coverings.

5. Level 5: Embed tape/mesh and apply separate first coat of joint compound to tape/mesh, fasteners, and trim flanges at panels surfaces exposed to view to receive gloss, semi-gloss sheen paints; critical lighting conditions.
- E. Identify fire rated sub-ceilings and partitions above finished ceiling line with permanently painted red lettering to read "FIRE AND SMOKE BARRIER – PROTECT ALL OPENINGS (___) HR. RATING". Letters to be to approximately 2-inch high, include appropriate hour rating. Apply to both sides of partition and 10 feet on center.

3.04 ACOUSTICAL INSTALLATION

- A. Place acoustical insulation in partitions tight within spaces, around cut opening, behind and around electrical and mechanical items in or behind partitions and tight to items passing through partitions.
- B. Apply acoustical sealant at floor track of two sided partitions and where sound rated partitions terminate at structure of multi-layer partitions. Seal electrical boxes and other penetrations, behind control joints and expansion joints and openings.

3.05 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, or mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 09 2116

SECTION 09 5113

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including GT Supplementary General Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional requirements.

1.02 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.03 REFERENCE STANDARDS

- A. American Architectural Manufacturers Association (AAMA):
 - 1. 611 Voluntary Specification for Anodized Architectural Aluminum.
- B. American Society for Testing and Materials (ASTM):
 - 1. A 580/A 580M Stainless Steel Wire.
 - 2. A 641/A 641M Zinc-Coated (Galvanized) Carbon Steel Wire.
 - 3. A 653/A 653M Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 4. B 164 Nickel-Copper Alloy Rod, Bar, and Wire.
 - 5. B 221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 6. B 633 Electrodeposited Coatings of Zinc on Iron and Steel.
 - 7. C 635/C 635M Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 8. C 636/C 636M Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
 - 9. C 834 Latex Sealants.
 - 10. D 3273 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
 - 11. D 3274 Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation.
 - 12. E 84 Test Method for Surface Burning Characteristics of Building Materials.
 - 13. E 90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 14. E 119 Test Methods for Fire Tests of Building Construction and Materials.
 - 15. E 488 Test Method for Strength of Anchors in Concrete and Masonry Elements.
 - 16. E 795 Practices for Mounting Test Specimens during Sound Absorption Tests.
 - 17. E 1190 Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members.

- | | | |
|-----|--------|--------------------------------------------------------------------------------|
| 18. | E 1264 | Classification for Acoustical Ceiling Products. |
| 19. | E 1512 | Test Methods for Testing Bond Performance of Bonded Anchors. |
| 20. | F 593 | Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs. |
| 21. | F 594 | Specification for Stainless Steel Nuts. |
| 22. | G 21 | Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi. |

1.04 ACTION SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
- C. Shop Drawings: Provide reflected ceiling plans accurately locating suspension system, lighting fixtures, air distribution devices, sprinkler devices and other ceiling related construction and indicate method of attaching suspension system hangers to building structure.
 - 1. Structural members to which suspension systems will be attached.
 - 2. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 - 3. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 - 4. Size and location of initial access modules for acoustical panels.
 - 5. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
 - 6. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
- D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.

1.05 INFORMATIONAL SUBMITTALS (FIO)

- A. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.
- B. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
- C. Field quality-control reports.

1.06 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.07 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
 - 3. Hold-Down Clips: Equal to 2 percent of quantity installed.
 - 4. Impact Clips: Equal to 2 percent of quantity installed.

1.08 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated and with record of successful in-service performance.
- B. Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying Work.
- C. Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying Work.
- D. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with following requirements:
 - 1. Fire-response tests were performed by UL or ITS/Warnock Hersey testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
 - 2. Surface-burning characteristics of acoustical panels comply with ASTM E1264 for Class A materials as determined by testing identical products per ASTM E84.
 - 3. Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," from ITS/Warnock Hersey's Directory of Listed Products," or from listing of another testing and inspecting agency, are identical in materials and construction to those tested per ASTM E119.
 - 4. Products are identified with appropriate markings of applicable testing and inspecting agency.
- E. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of typical ceiling area as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handling:
 - 1. Handle metal suspension system carefully to prevent warping, twisting, and bending of members. Remove and replace members having damaged or abraded paint finish.
 - 2. Handle acoustical ceiling panels carefully to prevent breaking corners and edges and to prevent soiling exposed surfaces.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.
- B. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.11 WARRANTY

- A. Provide Owner with written 30 year warranty for ceiling system from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Flame-Spread Index: Class A according to ASTM E 1264.
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.03 ACOUSTICAL PANELS

- A. Basis-of-Design Manufacturer: Trade names of Armstrong World Industries, Inc. are named herein to establish quality and design standards.
 - 1. Other Acceptable Manufacturers: Subject to compliance with all requirements of this specification, provide named products and systems or comparable products and systems by one of the following manufacturers:
 - a. CertainTeed Corporation.
 - b. USG.

- B. Acoustical Panel Type; A & B:
1. Basis-of-Design: Subject to compliance with project requirements, the design is based on the following: Armstrong World Industries, Inc., "Ultima High NRC - 1941".
 2. Classification: Provide ceiling panels complying with ASTM E 1264 for type, form and pattern as follows:
 - a. Surface Texture: Fine
 - b. Composition: Mineral Fiber
 - c. Color: White
 3. Size: 24 in x 24 in and 24" x 48"
 4. Edge Profile: Beveled Tegular 15/16-inch for interface with PRELUDE XL 15/16" Exposed Tee grid.
 5. Noise Reduction Coefficient(NRC): ASTM C 423; Classified with UL label on product carton 0.80
 6. Ceiling Attenuation Class (CAC) : ASTM C 1414; Classified with UL label on product carton 35
 7. Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton 170
 8. Flame Spread: ASTM E 1264; Class A (UL)
 9. Light Reflectance (LR) White Panel: ASTM E 1477; 0.87
 10. Dimensional Stability: HumiGuard Plus
 11. Recycle Content: Post-Consumer - 0% - 1% Pre-Consumer - 68% - 75%
 12. Material Ingredient Transparency: Health Product Declaration (HPD); Declare Label.
 13. Life Cycle Assessment: Third Party Certified Environment Product Declaration (EPD)
- C. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.04 METAL SUSPENSION SYSTEM

- A. Basis-of-Design Metal Suspension System Manufacturer: Armstrong Ceiling and Wall Solutions are named herein to establish quality and design standards. Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
1. Acceptable Product: "Prelude XL 15/16" Exposed Tee".
 2. Structural Classification: ASTM C 635, Heavy Duty.
 3. End Condition of Cross Runners: Override (stepped) type.
 4. Face Design: Flat, flush.
 5. Cap Material: Cold-rolled steel.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

2.05 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated.
- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, pre-stretched.

2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.
3. Ceiling Type B: Provide hanger wire at half span of 8' tees.
- C. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Angle Hangers: Angles with legs not less than 7/8-inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- E. Hold-Down Clips: Manufacturer's standard hold-down.
- F. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.
- G. Stabilizer Clips: For ceiling type B, provide 435-stabilizer clip.

2.06 METAL EDGE MOLDINGS AND TRIM

- A. Basis-of-Design Manufacturer: Trade names of Armstrong World Industries, Inc. are named herein to establish quality and design standards.
 1. Other Acceptable Manufacturers: Subject to compliance with all requirements of this specification, provide named products and systems or comparable products and systems by one of the following manufacturers:
 - a. CertainTeed Corporation.
 - b. USG.
- B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

2.07 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 07 9200 Caulking and Sealants.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.03 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.
 - 1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 8. Do not attach hangers to steel deck tabs.
 - 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - 10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 - 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.
 2. Carefully cut panels where required to fit recessed lighting fixtures and air distribution devices and sprinkler drops.
 3. Provide additional hanger wires at corners of each lay-in fixture, and elsewhere as required by each item installed in ceiling.
 4. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings. Space hold-down clips as recommended by panel manufacturer's unless otherwise indicated or required.
 5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
 6. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.04 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.05 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and post-installed anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two post-installed anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.

2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- D. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

3.06 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 6513

RUBBER BASE AND ACCESSORIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

1.03 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.04 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Coordinate mockups in this Section with mockups specified in other Sections.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.06 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F.

- C. Install products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.01 RUBBER BASE

- A. Basis-of-Design Manufacturer: Johnsonite; a Tarkett Company
 - 1. Other Acceptable Manufacturers:
 - a. Armstrong World Industries, Inc.
 - b. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
 - 1. Group: I (solid, homogeneous).
 - 2. Style and Location: As indicated in Drawings.
 - 3. Thickness: 1/8-inch.
 - 4. Height: 4 & 6 inches as indicated on drawings.
 - 5. Lengths: Coils in manufacturer's standard length.
 - 6. Outside Corners: Job formed.
 - 7. Inside Corners: Job formed.
 - 8. Colors: To be selected for manufacturer's standard color range.

2.02 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Stair Accessories: Prepare horizontal surfaces according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 3. Concrete must have a minimum compressive strength of 3500 PSI and be prepared in compliance with ASTM F710. Concrete surfaces to be flattened with a self-leveling underlayment or a patch to prevent imperfections from telegraphing through flooring materials.
 4. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
 5. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum percent relative humidity level measurement rate as recommended per the adhesive.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.03 RUBBER STAIR ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing rubber stair accessories.
- B. Rubber Stair Accessories:
 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 2. Tightly adhere to substrates throughout length of each piece.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.04 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. ***Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 12 inches in length.***
 - 1. ***Form without producing discoloration (whitening) at bends.***
- H. ***Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 12 inches in length.***
 - 1. ***Miter or cope corners to minimize open joints.***

3.05 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 6513

SECTION 09 6519
RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional requirements.

1.02 SUMMARY

- A. Section Includes:
 - 1. Vinyl composition floor tile.

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
 - 1. C 109 Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
 - 2. D 695 Test Method for Compressive Properties of Rigid Plastics.
 - 3. D 695 Test Method for Compressive Properties of Rigid Plastics.
 - 4. D 2240 Test Method for Rubber Property Durometer Hardness.
 - 5. D 2240 Test Method for Rubber Property Durometer Hardness.
 - 6. E 648 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 7. E 662 Standard Test Method for Specific Optical Density of Smoke Generated
 - 8. F 510 Test Method for Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Meter.
 - 9. F 710 Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - 10. F 970 Test Method for Static Load Limit.
 - 11. F 1066 Vinyl Composition Floor Tile.
 - 12. F 1344 Rubber Floor Tile.
 - 13. F 1516 Practice for Sealing Seams of Resilient Flooring Products by the Heat Weld Method (when Recommended).
 - 14. F 1700 Solid Vinyl Floor Tile.
 - 15. F 1869 Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - 16. F 2170 Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - 17. F 2982 Polyester Composition Floor Tile.
 - 18. E 648 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
- B. American with Disabilities Act Architectural Guidelines (ADAAG).
- C. National Fire Protection Association (NFPA):
 - 1. 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

1.04 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data:
 - 1. Manufacturer's recommended maintenance instructions for Owner's use.
 - 2. Underlayment and leveling compound manufacturer's installation instructions and approval of compatibility with finish flooring.
- C. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 1. Show details of special patterns.
 - 2. Show details of flooring transitions to different adjacent materials.
- D. Samples: Full-size units of each color, pattern and style selected by Architect.
- E. Product Schedule: For floor tile. Use same designations indicated on Drawings.
- F. Qualification Data (FIO): For Installer.
- G. Fire Test Certification (FIO): Submit manufacturer's certification that flooring has been tested by independent laboratory and complies with required fire tests.

1.05 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.06 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.07 QUALITY ASSURANCE

- A. Manufacturer: Provide each type of resilient flooring and accessories by a single manufacturer, including recommended primers, adhesives, sealants, including moisture mitigation system, finish accessories and leveling compounds.
- B. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.
- C. Pre-Installation Meeting: Pre-installation meeting to verify project requirement, substrate conditions, manufacturer's installation instructions, manufacturer's warranty requirements, and installer qualifications.
- D. Bond Test: Install multiple bond test using a 3'-0" x 3'-0" pieces of material adhered with the appropriate adhesive to verify quality of adhesion. Remove half of each piece after 24 hours, then the other half after 48 hours. Assess resistance to indentation, place end user equipment onto a sample for 72 hours.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.09 PROJECT CONDITIONS

- A. Environmental Requirements: Maintain ambient temperatures within range recommended by manufacturer, and not less than 70 deg F or more than 95 deg F for 48 hours prior to, during and thereafter installation, in spaces to receive floor tile.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.02 LUXURY VINYL FLOOR TILE; LVT-1

- A. Basis-of-Design Manufacturer: In accordance with Client.

2.03 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. TS-4 Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile indicated, of height required to protect exposed edges of resilient floor covering, and of maximum lengths to minimize running joints. Basis-of-Design Manufacturer: Schluter Systems "Vinpro-S".
- D. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer if required.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of Work. Verify that substrate

conditions are acceptable for product installation in compliance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).

- B. Visually inspect flooring materials, adhesives and accessories prior to installation. Do not install flooring material with visual defects.
- C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of flooring material.
- D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.
- E. Report conditions contrary to contract requirements that would prevent proper installation. Do not proceed with installation until unsatisfactory conditions have been corrected.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare in compliance with ASTM F 710. Perform pH tests on concrete floors regardless of their age or grade level. Document and retain test results.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
 - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. in 24 hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 80 percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.03 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as required.

- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles with grain direction as indicated on the drawings, or if no grain is indicated, with grain running in one direction for plank (rectangular) materials and with grain direction alternating in adjacent tiles (basket-weave pattern) for square materials.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.04 ACCESSORY INSTALLATION

- A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
- B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
- C. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.
- D. Apply metal edge strips where shown on Drawings, after flooring installation. Secure units to substrate, complying with edge strip manufacturer's recommendations.

3.05 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.

- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Substantial Completion.

END OF SECTION

SECTION 09 6813

TILE CARPETING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional requirements.

1.02 REFERENCE STANDARDS

- A. American Association of Textile Chemists and Colorists (AATCC):
 - 1. 16 Colorfastness to Light.
 - 2. 24 Resistance of Textiles to Insects.
 - 3. 134 Electrostatic Propensity of Carpets.
 - 4. 165 Colorfastness to Crocking: Carpets - AATCC Crockmeter Method.
 - 5. 174 Antimicrobial Activity Assessment of Carpets.
- B. American National Standards Institute/NSF International (ANSI/NSF):
 - 1. 140 Sustainable Carpet Assessment Standard.
- C. American Society for Testing Materials (ASTM):
 - 1. E 648 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 2. E 662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 3. E 2471 Test Method for Using Seeded-Agar for the Screening Assessment of Antimicrobial Activity In Carpets.
 - 4. F 710 Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- D. National Fire Protection Association (NFPA):
 - 1. 253 Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

1.03 SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- C. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.

5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

E. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

F. Qualification Data;(FIO): For Installer.

G. Product Test Reports;(FIO): For carpet tile, for tests performed by a qualified testing agency.

H. Sample Warranty;(FIO): For special warranty.

1.04 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association.

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

1. Build mockups at locations and in sizes shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI's "CRI Carpet Installation Standard."

1.08 PROJECT CONDITIONS

A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.

- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.09 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 CARPET TILE

- A. Basis-of-Design Manufacturer: In accordance with the Finish Schedule.

2.02 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints. Basis-of-Design Manufacturer: In accordance with the Finish Schedule.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
 - 2. Subfloor finishes comply with requirements specified in Section 03 3000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8-inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.03 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.04 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.

- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."

- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

SECTION 09 9000

PAINTS AND COATINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 REFERENCE STANDARDS

- A. Green Seal Standard GS-11; May 20, 1993.
- B. Occupational Safety and Health Act (OSHA) - Safety Standards.
- C. American National Standards Institute (ANSI) - Performance Standards.
- D. Paint Decorating Contractors of America (PDCA) - Application Standard.
- E. National Paint and Coatings Association (NPCA) - Gloss Standard.
- F. American Society for Testing Materials (ASTM) - Testing Methods.
 - 1. D523 Test Method for Specular Gloss.
- G. Master Paint Institute (MPI #) - Established paint categories and standards.
- H. Ozone Transmission Commission (OTC) - Established levels of Volatile Organic Compounds.
- I. SCAQMD 1168 - South Coast Air Quality Management District Rule #1168; October 3, 2003.
- J. SSPC (PM1) - Steel Structures Painting Manual, Vol. 1, Good Painting Practice; Society for Protective Coatings; 1993, Third Edition.
- K. SSPC (PM2) - Steel Structures Painting Manual, Vol. 2, Systems and Specifications; Society for Protective Coatings; 1995, Seventh Edition.
- L. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

1.03 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.04 ACTION SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: Provide product data minimum 30 days before beginning painting Work for each type of product. Include preparation requirements and application instructions.
 - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
 - 3. Indicate manufacturer, brand name, quality and type paint for each surface to be painted and finished.
- C. Samples: Provide sample finish for surfaces and colors requested by Architect.
 - 1. Label each sample with formula, color name and number, sheen designation and gloss units.
 - 2. Submit samples on rigid backing, 8 inches square.
 - 3. Apply coats on Samples in steps to show each coat required for system.
 - 4. Label each sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.
 - 3. Keep one usable fire extinguisher in storage area.

1.06 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Provide adequate continuous ventilation and sufficient heating to maintain temperature above 45 deg F. for 24 hours before, during and 48 hours after application of finishes.
- D. Protection:
 - 1. Adequately protect other surfaces from paint and damage. Repair damage resulting from inadequate and unsuitable protection.
 - 2. Furnish sufficient drop cloths, shields and protective equipment to prevent spray and droppings from damaging surfaces not being painted and in particular, surfaces within storage and preparation area.
 - 3. Place cotton waste, cloths and material which may constitute fire hazard in closed metal containers and remove daily from site.
 - 4. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items are to be carefully stored, cleaned and replaced on completion of work in each area. Do not use solvent that may remove permanent lacquer finish to clean hardware.
 - 5. Protect surfaces and materials not to be painted.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Basis-of-Design Manufacturer; Sherwin-Williams is named herein to establish quality and design standards. Subject to compliance with requirements, provide named products and systems by Sherwin-Williams as listed in the Painting Schedule for paint category indicated.
 - 1. Benjamin Moore & Co.
 - 2. PPG Architectural Coatings.

2.02 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As indicated in finish schedule.
- D. Single Source Responsibility: Obtain through-penetration and fire-resistant joint firestop systems for each kind of penetration and construction indicated from a single manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions scheduled to be painted prior to beginning of Work for compliance with requirements; for maximum moisture content and other conditions affecting performance of Work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
 - 5. Gypsum Board: 12 percent.
 - 6. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Report all substrates and materials exhibiting mildew of the surface to Architect.
 - 2. Do not clean and paint substrates and materials exhibiting mildew on surface without Architect's prior examination.
 - 3. Application of coating indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- F. Wood Substrates:
 - 1. Seal top and bottom edges of wood doors with 2 coats of shellac or other effective sealer immediately upon door delivery to Project site, and after trimming to size.

3.03 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.04 MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Review Divisions 23 and 26 for items of mechanical and electrical equipment to be painted.
- B. Repaint exposed machinery and equipment as necessary to repair damaged finish. Do not paint over nameplates on machinery and equipment.
- C. Remove grilles, covers and access panels for mechanical and electrical systems from location and paint separately.
- D. Finish paint primed equipment to color selected.
- E. Paint, to limit of sight line, interior surfaces of air ducts, convactor and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint. Paint dampers exposed immediately behind louvers, grilles, convactor and baseboard cabinets to match face panels.
- F. Paint exposed conduit and electrical equipment occurring in finished areas. Color and texture to match adjacent surfaces.
- G. Paint both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.
- H. Size and paint exposed insulated piping, insulated ducts, heat exchanger shells, including those having insulated surfaces finished with canvas, with 2 coats interior latex paint after priming foil or jacket with compatible primer recommended by manufacturer.

3.05 FIELD QUALITY CONTROL

- A. Surfaces which require paint finish are to be properly and completely finished with materials and in manner similar to other surfaces of similar type.
- B. Runs, sags, drips, drapes, thin spots, holidays and other unworkmanlike results will not be accepted. Cut in sharp lines and color breaks.

- C. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.06 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.07 INTERIOR PAINTING SCHEDULE

- A. Number of coats specified herein are minimum number to cover and finish decorated surfaces. If, after specified number of coats are applied, surfaces are not completely covered, apply additional coats as necessary at no additional cost to Owner. Allow each coat to dry thoroughly before applying succeeding coat.
 - 1. Colors:
 - a. As indicated on Finish Schedule.
- B. Galvanized-Metal Substrates; Hollow Metal Doors and Frames:
 - 1. Latex System MPI INT 5.3A:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - 1) S-W Pro Industrial Pro-Cryl Universal Primer B66W310.
 - 2) PPG Pitt Tech Plus Waterborne Acrylic Primer Finish, 4020PF.
 - b. Second and Third Coat: Latex, interior, semi-gloss (MPI Gloss Level 5), MPI #141.
 - 1) S-W Pro Industrial Pre-Catalyzed Water Based S/G Epoxy Semi-Gloss K46W01151.
 - 2) PPG Manor Hall Latex Semi-Gloss, 82-500.
 - 2. Direct to Metal (DTM); where not factory primed; Ducts: Remove any passivators.
 - a. S-W Solo, A76 W51.
 - b. PPG Pitt Tech, 90-1210.

C. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 9.2M;
 - a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
 - 1) S-W ProMar 200 Zero VOC Interior Latex Primer B28W02600.
 - 2) PPG Speedhide Zero Interior Zero VOC Latex Sealer, 6-4900XI.
 - b. Typical/ Walls and Partitions; Second and Third Coat: Latex, interior, institutional low odor/VOC eggshell (MPI Gloss Level 2), MPI #144.
 - 1) S-W ProMar 200 HP Zero VOC Interior Acrylic Low Gloss Eg-Shel B41W01951.
 - 2) PPG Speedhide Zero Interior Zero VOC Latex Eggshell, 6-4510XI.

- c. Typical Ceilings; Second and Third Coat: Latex, interior, institutional low odor/VOC flat (MPI Gloss Level 1), MPI #143.
 - 1) S-W ProMar 200 Zero VOC Interior Latex Flat B30W12651.
 - 2) PPG Speedhide Zero Interior Zero VOC Latex Flat, 6-4110XI.

END OF SECTION 09 9000

SECTION 12 3661

QUARTZ AGGLOMERATE COUNTERTOPS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Refer to "Georgia Tech Yellow Book" Design Standards current edition for additional requirements.

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
 - 1. C 97 Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
 - 2. C 170 Test Method for Compressive Strength of Dimension Stone.
 - 3. C 501 Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by Taber Abraser.
 - 4. C 834 Specification for Latex Sealants.
 - 5. C 920 Specification for Elastomeric Joint Sealants.
 - 6. D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 7. E 84 Test Method for Surface Burning Characteristics of Building Materials.

1.03 ACTION SUBMITTALS

- A. General: In compliance with Section 01 3300 and as specified herein.
- B. Product Data: For countertop materials.
- C. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
 - 1. Show locations and details of joints.
 - 2. Show direction of directional pattern, if any.
- D. Samples for Initial Selection: For each type of material exposed to view.
- E. Samples for Verification: For the following products:
 - 1. Countertop material, 6 inches square.
 - 2. One full-size quartz agglomerate countertop, with front edge and backsplash, 8 by 10 inches, of construction and in configuration specified.

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

1.05 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For quartz agglomerate countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.
- C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
 - 1. Build mockup of typical countertop as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 PROJECT CONDITIONS

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

1.08 COORDINATION

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

PART 2 - PRODUCTS

2.01 QUARTZ AGGLOMERATE COUNTERTOP MATERIALS

- A. Quartz Agglomerate; Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with ICPA SS-1.
 - 1. Basis-of-Design Manufacturers:
 - a. DuPont, "Corian Quartz".
 - 2. Other Acceptable Manufacturers:
 - a. Cambria.
 - b. Samsung Chemical USA, Inc.
 - 3. Material Thickness: 0.79 inch (2 cm), nominal.
 - 4. Material Weight: 10 lb/sq.ft. (48.8 kg/sq. m) for 0.79 inch (2 cm) thick surfacing.
 - 5. Edge Detail: As indicated in Drawings.
 - 6. Colors and Patterns: As indicated on Finish Legend.
- B. Plywood: As specified in Section 06 4116.

2.02 COUNTERTOP FABRICATION

- A. Fabricate countertops according to quartz agglomerate manufacturer's written instructions and the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Premium.
- B. Configuration: As indicated in Drawings.

- C. Countertops: 3/4-inch-thick, quartz agglomerate with front edge built up with same material.
- D. Backsplashes: 3/4-inch-thick, quartz agglomerate.
- E. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with quartz agglomerate manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 1. Fabricate with loose backsplashes for field assembly.
- F. Joints: Fabricate countertops without joints.
- G. Cutouts and Holes:
 - 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
 - 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
 - 3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.03 INSTALLATION MATERIALS

- A. Counter Support Brackets: Basis-of-Design Manufacturer: Rangine Corp. "Rakks EH-1818 Inside Mount Counter Support Bracket". L-shaped bracket fabricated from aluminum T sections designed for supporting counter depths up to 25-inches. Provide Left and Right sided inside mounts determined by field conditions.
 - 1. Load capacity per bracket: 300 pounds.
- B. Adhesive: Product recommended by quartz agglomerate manufacturer.
- C. Sealant for Countertops: Comply with applicable requirements in Section 07 9200.
- D. Z-Clips: Provide quartz manufacturer's recommended Z-clips for installation of material in both vertical and horizontal application.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates to receive quartz agglomerate countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

- C. Secure countertops to subtops with adhesive according to quartz agglomerate manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- D. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- E. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Pre-drill holes for screws as recommended by manufacturer.
- F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
 - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.
- G. Install SS-2 in vertical and horizontal wall applications as indicated in Drawings using Quartz manufacturer's written installation instructions and as approved in Shop Drawings. Ensure proper support materials in horizontal and vertical wall applications.
- H. Apply sealant to gaps at walls; comply with Section 07 9200.

3.03 COUNTERTOP SUPPORT BRACKET INSTALLATION

- A. Coordinate requirements for stud spacing, blocking, and auxiliary structural supports to ensure adequate means for installation and anchorage of support brackets.
- B. Install support brackets in compliance with approved shop drawings and manufacturer's installation instructions.
- C. Install brackets at locations and heights indicated on Drawings. Verify locations in field with Architect.
- D. Install brackets rigidly to blocking and metal studs so that they are secure, plumb, and aligned. Install with fasteners of type, size, and quantity as supplied or recommended by bracket manufacturer for type of application and substrate.

END OF SECTION

