PROJECT MANUAL
TECHNICAL SPECIFICATIONS

BUILDING 18
RESTROOM UPGRADES
ROOMS 120 & 121

AT THE

University of West Florida

PENSACOLA, FLORIDA

CONSTRUCTION DOCUMENTS

DAG PROJECT NO. 14044B
UWF PROJECT NO. 1415-005
OCTOBER 28, 2015

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PROJECT MANUAL – TECHNICAL SPECIFICATIONS

UNIVERSITY OF WEST FLORIDA
BUILDING 18 – RESTROOM UPGRADES 120 &121

PENSACOLA, FLORIDA

UWF Project Nos. 1415-005
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SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

B. Related Sections:

1. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
2. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
3. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
4. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.

12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request 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.

1.3 FINAL COMPLETION

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

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

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

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

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

1. Organize list of spaces in sequential order, starting with exterior areas first.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Submit list of incomplete items in the following format:

    a. One paper copy, unless otherwise indicated. Architect.

1.5 WARRANTIES

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

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 215-by-280-mm (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.
4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.

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

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 FINAL CLEANING

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

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

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. 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.
f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
g. Sweep concrete floors broom clean in unoccupied spaces.
h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

    1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.

l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Emergency manuals.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of products, materials, and finishes, systems and equipment.

B. See Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.2 SUBMITTALS

A. Manual: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit 2 copies of each corrected manual within 15 days of receipt of Architect's comments.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, table of contents, and manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 215-by-280-mm (8-1/2-by-11-inch) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

   a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for type of emergency, emergency instructions, and emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component for fire, water leak, power failure and equipment failure.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include instructions on stopping, shutdown instructions for each type of emergency, operating instructions for conditions outside normal operating limits, and required sequences for electric or electronic systems.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUAL

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

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment:

D. Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions that detail essential maintenance procedures:

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a

tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.

F. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

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SECTION 02 41 19 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. **Demolition and removal of selected portions of building or structure.**
   2. **Demolition and recycle of select materials including gypsum board and acoustical ceiling tile in accordance with University Standard Procedures.**

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.
B. Predemolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Comply with Division 01 Section "Photographic Documentation." Submit before Work begins.
C. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
D. Standards: Comply with ANSI A10.6 and NFPA 241.
E. Predemolition Conference: Conduct conference at Project site.

1.5 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: Hazardous materials are present in construction to be selectively demolished in separate contract prior to construction. 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.
   3. If hazardous materials are encountered during demolition, stop work and contact the University Project Manager for direction and to engage Environmental Health and Safety.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

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

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

F. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
   1. Comply with requirements specified in Division 01 Section "Photographic Documentation."

G. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."
B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
C. Temporary Shoring: 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.

3.4 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   5. Dispose of demolished items and materials promptly.
B. 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.
C. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
D. 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.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.
   1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

B. Air Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 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.

END OF SECTION 02 41 19

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Interior non-load bearing wall framing.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   1. Deflection limits : Design framing systems to withstand design without deflections greater than the following:

      a. Interior Non-Load Bearing Wall Framing: Horizontal deflectoin of **1/360** of the wall height under a horizontal load of 5 lb/sq. (2239 Pa).

1.3 SUBMITTALS

A. Product Data: For each type of product and accessory indicated.
B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
   1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
C. Welding certificates.
D. Product test reports.

E. Sustainable Submittals:

   1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

1.4 QUALITY ASSURANCE

A. Installers Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of Florida who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design and extent.
C. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements.
D. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code--Sheet Steel."
E. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
F. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

PART 2 - PRODUCTS

2.1 MANUFACTUERS

A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
   1. Clark Steel Framing.
   2. Dale/Incor.
   3. Dietrich Metal Framing; a Worthington Industries Company.
   4. SCAFCO Corporation.
   5. United Metal Products, Inc.

2.2 MATERIALS

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: **As required by structural performance**
   2. Coating: **G60 (Z180) .**

2.3 NON LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: As required for structural performance
B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and same minimum base-metal thickness as steel studs.
C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: As required for structural performance.
   2. Flange Width: As required for structural performance.
D. Steel Double-L Headers: Manufacturer’s standard L-shapes used to form header beams, and same minimum base-metal thickness as steel box or back-to-back headers.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members, unless otherwise indicated.
B. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.
C. Anchor Bolts: ASTM F 1554, Grade [36] [55], threaded carbon-steel [hex-headed bolts] [headless, hooked bolts] [headless bolts, with encased end threaded,] and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by [hot-dip process according to ASTM A 153/A 153M, Class C] [mechanically deposition according to ASTM B 695, Class 50].
D. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
E. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

F. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
G. Welding Electronics: Comply with AWS standards.

2.5 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.
B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
C. Nonmetallic, Nonstick Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.
F. Thermal Insulation: ASTM C 665 Type I, unfaced mineral-fiber blankets produced by combining glass or slag fibers with thermosetting resins.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

A. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
B. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
C. Install framing members in one-piece lengths.
D. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
F. Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
   1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 INTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
B. Fasten both flanges of studs to bottom track, unless otherwise indicated. Space studs as follows:
   1. Stud Spacing: **As indicated on the drawings**.
C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
   1. Install single deflection tracks and anchor to building structure.
   2. Install double deflection tracks and anchor outer track to building structure.
   3. Connect vertical deflection clips to **infill** studs and anchor to primary building structure.
E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
   1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within **12 inches (305 mm)** of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
   2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
   3. Proprietary bridging bars installed according to manufacturer's written instructions.
F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable curtain-wall-framing system.

3.4 FIELD QUALITY CONTROL

A. Testing: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Field and shop welds will be subject to testing and inspecting.
C. Testing agency will report test results promptly and in writing to Contractor and Architect.
D. Remove and replace work where test results indicate that it does not comply with specified requirements.
E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Wood blocking, cants, and nailers.
   2. Wood furring and grounds.
   3. Wood sleepers.
   4. Plywood backing panels.
   5. Wood framing.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.
   1. Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
   1. Preservative-treated wood.
   2. Fire-retardant-treated wood.
   3. Power-driven fasteners.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
   3. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction.
      a. Ammoniacal, or amine, copper quat (ACQ).
      b. Copper Azole.
   2. Preservative Chemicals: Acceptable for painting and staining:
      a. KDAT (Kiln dried after treatment).
      b. Waterborne preservative.

3. Fasteners: Provide either stainless steel or galvanized steel, ASTM 653, Grade G185 sheet with 1.85 ounces of zinc coating per square foot minimum. Do **not** allow aluminum to have contact with pressure preservative wood.
4. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
5. Wrapped Blocking: All pressure treated wood shall be wrapped with 30 to 40 mil self-adhering polyethylene membrane. All galvanized metals should be fastened by G185 fasteners. All aluminum & stainless steel shall be fastened by stainless steel fasteners.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
C. Application: Treat indicated items and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).
1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.
2. Use Exterior type for exterior locations and where indicated.
3. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
4. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
C. Application: Treat all miscellaneous carpentry, indicated on Drawings, and the following:
1. Framing for raised platforms.
2. Concealed blocking.
3. Roof construction.
4. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.
B. Non-Load-Bearing Interior Partitions: Construction or No. 2 or better grade of any of the following species:
1. Mixed southern pine; SPIB.
2. Eastern softwoods; NELMA.
3. Northern species; NLGA.
4. Western woods; WCLIB or WWPA.

C. Framing Other Than Non-Load-Bearing Interior Partitions: Construction or No. 2 or better grade and any of the following species:
1. Hem-fir (north); NLGA and Hem-fir; WCLIB or WWPA.
2. Southern pine; SPIB.
3. Douglas fir-larch; WCLIB or WWPA, Douglas fir-south; WWPA and Douglas fir-larch (north); NLGA.
4. Spruce-pine-fir; NLGA and Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Rooftop equipment bases and support curbs.
   4. Cants.
   5. Furring.
   6. Grounds.
   7. Utility shelving.

B. For items of dimension lumber size, provide Construction or No. 2 or better grade lumber with 19 percent maximum moisture content of any species.

C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
   1. Mixed southern pine, No. 2 grade; SPIB.
   2. Eastern softwoods, No. 2 Common grade; NELMA.
   3. Northern species, No. 2 Common grade; NLGA.
   4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.6 PLYWOOD BACKING PANELS

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

2.7 FASTENERS

A. General: Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide stainless steel fasteners.

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

C. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

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

C. Do not splice structural members between supports, unless otherwise indicated.

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

E. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. NES NER-272 for power-driven fasteners.
   2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

F. Wood Trim Installation: Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.
   1. Match color and grain pattern across joints.

2. Install trim after gypsum board joint-finishing operations are completed.
3. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.6-mm) maximum offset for reveal installation.

3.2 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.

END OF SECTION 06 10 53

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Plastic-laminate cabinets.
   2. Solid Surface countertops.

B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips unless concealed within other construction before woodwork installation.

1.2 SUBMITTALS

A. Product Data: For solid-surfacing material, cabinet hardware and accessories and finishing materials and processes.
B. Submit for approval samples, shop drawings, product data, mock-ups.
C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
D. Samples:
   1. Plastic-laminates, for each type, color, pattern, and surface finish.
   2. Thermoset decorative panels, for each type, color, pattern, and surface finish.
   3. Solid Surface

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of woodwork.
B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards".
C. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Quality standard for fabrication and products: Architectural Woodwork Institute Quality Standards, Premium grade unless noted otherwise.

B. Plastic laminate: NEMA LD-3, glued-on melamine paper is not allowed.

C. Base cabinets and wall cabinets:

1. Construction: Reveal overlay, Grade M-2 medium-density particleboard substrate, sink cabinet bodies shall have moisture resistant plywood substrate, wall cabinets shall have a clear inside depth of 12 inches, drawer boxes shall be of wood construction, drawers shall have separate front panel attached to drawer box, no staples allowed.
2. Exposed surfaces: High-pressure decorative laminate as follows:
   a) Horizontal surfaces other than tops: GP-50.
   b) Vertical surfaces: GP-28.
   c) Body edges: 0.5 mm PVC, color matched.
   d) Door/drawer edges: 3 mm PVC tape, machine applied.
3. Semi-exposed surfaces:
   a) Surfaces other than drawer bodies: High-pressure decorative laminate, Grade CL-20.
   b) Drawer sides and backs: Thermoset decorative overlay.
   c) Drawer bottoms: Thermoset decorative overlay.
4. Countertops: countertops shall be built in solid lengths of Solid Surface:
   a) Configuration: Provide countertops with the following front style:
   b) Front: Straight, slightly eased at top.
   c) Countertops: ½-inch thick, solid surface material with front edge built up with same material.
   d) Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.
   e) Color: As selected by Architect from manufacturers full range
   f) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1 Avonite Surfaces
      2 Formica Corporation
      3 Wilsonart International
      4 Corian
5. Adjustable shelving: 32 mm in-line boring with double-pin reinforced plastic shelf supports.
   a) Edge: 0.5 mm PVC, color matched, all four edges.

D. Hardware: Steel or brass with satin-chromium plate finish. Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard

1. Drawer slides: BHMA B05091; zinc-plated, ball bearing side-mount full-extension, minimum 75-lbf rating, provide 150-lbf rating at file drawers.
2. Hinges: BHMA B01521; 2-3/4" x .095" semi-concealed, 5-knuckle.
3. Catches: BHMA B03091; metal single-roller catch, magnetic catches are not allowed. Provide Heavy Duty roller catches only.
4. Pulls: BHMA B02011; 4" back-mounted steel or brass wire pulls.
5. Locks: BHMA E07261; cam lock, key removable in locked and unlocked positions, all locks shall be keyed alike.
6. L-brackets: Epoxy coated 5 mm steel bar, Knape & Vogt 208 WH or approved equal.
7. Grommets: 2" diameter molded black plastic countertop grommet with slot for wire/cable passage and matching plastic cap at each open knee space.

2.2 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, fire-retardant-treated, kiln-dried to less than 15 percent moisture content.
B. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

2.3 FINISHING

A. Final touchup, filling countersunk fasteners, cleaning and polishing after installation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.
B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm). Shim as required with concealed shims.
D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
    1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c.
G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between counter/back splash and wall with sealant specified in Division 07 Section "Joint Sealants."
H. Comply with AWI quality standards and mark each piece with manufacturer's identification and AWI quality grade. Comply with details shown for profile and construction features.

    1. Casework: AWI premium grade, laminate covered reveal overlay construction, institutional hardware quality level.
    2. Countertops: AWI premium grade, butted backsplash and self-edge at front lip.

I. Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
J. Install work plumb, level, true and straight, scribe to fit. Anchor securely with concealed fasteners.
K. Repair or replace damaged work, clean, lubricate and adjust hardware; protect work until final acceptance.

END OF SECTION 06 40 23

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SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Concealed and sound attenuation building insulation **in all new partitions for sound transfer.**

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Samples for Verification: Full-size units for each type of exposed insulation indicated.
C. Product test reports.
D. Research/Evaluation Reports: For foam-plastic insulation.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer, unless noted otherwise.
B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
   1. Surface-Burning Characteristics: ASTM E 84.
   2. Fire-Resistance Ratings: ASTM E 119.
   3. Combustion Characteristics: ASTM E 136.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION (SOUND BATTS)

A. Manufacturers:
   1. CertainTeed Corporation.
   2. Guardian Fiberglass, Inc.
   3. Johns Manville.
   4. Knauf Fiber Glass.
   5. Owens Corning.
B. Unfaced, Flexible Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, passing ASTM E 136 for combustion characteristics.
C. To used at all new interior partitions and horizontally on acoustical ceilings above offices.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
B. Install glass-fiber insulation in cavities formed by framing members according to the following requirements:
    1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
    2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
    3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures.
    4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically to metal studs.
C. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

END OF SECTION 07 21 00

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Latex joint sealants.
4. Acoustical joint sealants.

1.2 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Product test reports.

C. Warranties.

1.3 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

2.2 SILICONE JOINT SEALANTS

A. Mildew-Resistant, Acid-Curing Silicone Joint Sealant **SS-#1**: ASTM C 920.

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

a. BASF Building Systems.
b. Dow Corning Corporation.
c. GE Advanced Materials - Silicones.

2. Type: Single component (S).
3. Grade: Nonsag (NS).
4. Class: 25.
5. Uses Related to Exposure: Nontraffic (NT).

B. Neutral-Curing Silicone Joint Sealant **SS-#2**: ASTM C 920.

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

a. Dow Corning Corporation.
b. Pecora Corporation.
c. Tremco Incorporated.

2. Type: Single component (S).
3. Grade: Nnonsag (NS)].
4. Class: 100/50.
5. Uses Related to Exposure: Traffic (T).

C. Neutral-Curing Silicone Joint Sealant **SS-#3**: ASTM C 920.

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

a. BASF Building Systems.
b. Dow Corning Corporation.
c. GE Advanced Materials - Silicones.
d. Pecora Corporation.
e. Sika Corporation; Construction Products Division.

2. Type: Single component (S).
3. Grade: Nonsag (NS).
4. Class: 50.
5. Uses Related to Exposure: Nontraffic (NT).

2.3 URETHANE JOINT SEALANTS

A. Urethane Joint Sealant **US #1**: ASTM C 920.

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

a. BASF Building Systems.

b. Bostik, Inc.
c. Pecora Corporation.
d. Sika Corporation; Construction Products Division.

2. Type: Single component (S).
3. Grade: Nonsag (NS).
4. Class: 25.
5. Uses Related to Exposure: Traffic (T).

2.4 HYBRID JOINT SEALANTS

A. Hybrid Joint Sealant **HS #1**: ASTM C 920.

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

a. BASF Building Systems.
b. Approved equivalent product.

2. Type: Single component (S).
3. Grade: Nonsag (NS).
4. Class: 100/50.
5. Uses Related to Exposure: Nontraffic (NT).

2.5 LATEX JOINT SEALANTS

A. Latex Joint Sealant **LS-#1**: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Building Systems.
b. Bostik, Inc.
c. May National Associates, Inc.
d. Pecora Corporation.
e. Schnee-Morehead, Inc.
f. Tremco Incorporated.

2.6 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint Sealant **AS-#1**: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Pecora Corporation.

b. USG Corporation.

2.7 JOINT SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

1. Remove laitance and form-release agents from concrete.
2. 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.

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.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. 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.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. 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.

E. 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.

F. Acoustical Sealant Installation: Comply with ASTM C 919 and with manufacturer's written recommendations.

G. 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.

3.3 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Interior joints in horizontal traffic surfaces **SS-#2**.

1. Joint Locations:

a. Control and expansion joints in tile flooring.

2. Joint Sealant: Silicone.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces **LS-#1**.

1. Joint Locations:

a. Control and expansion joints on exposed interior surfaces of exterior walls.

b. Perimeter joints of exterior openings where indicated.
c. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
d. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
e. Other joints as indicated.

2. Joint Sealant: Latex.
3. Joint-Sealant Color: White.

C. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces **SS-#1**.

1. Joint Sealant Location:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated.

2. Joint Sealant: Silicone.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces **AS-#1**.

1. Joint Location:

a. Acoustical joints where indicated.
b. Other joints as indicated.

2. Joint Sealant: Acoustical.
3. Joint-Sealant Color: White.

END OF SECTION 07 92 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior Moisture Resistant gypsum board (where there is no tile)

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Regional Materials: Gypsum panel products shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

C. Regional Materials: Gypsum panel products shall be manufactured within 500 miles (800 km) of Project site.

2.3 INTERIOR GYPSUM BOARD

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

1. Georgia-Pacific Gypsum LLC.
2. National Gypsum Company.
3. USG Corporation.

B. Moisture Resistant Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8” at walls
2. Long Edges: Tapered.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

A. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

B. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing).

1. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

C. Acoustical Joint Sealant: ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
b. Grabber Construction Products; Acoustical Sealant GSC.
c. Pecora Corporation; AC-20 FTR.
d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
e. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical joint sealant shall have a VOC content of **250** g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

A. Comply with ASTM C 840.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

1. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

E. Prefill open joints and damaged surface areas.

F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

a. Primer and its application to surfaces are specified in other Division 09 Sections.

H. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

I. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Ceramic and Porcelain tile.
2. Tile backing panels
3. Stone thresholds.
4. Metal edge strips

B. Related Sections:
1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Module Size: Actual tile size plus joint width indicated.

C. Face Size: Actual tile size, excluding spacer lugs.

1.4 ACTION SUBMITTALS

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

B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 6-inch (150-mm) lengths.
4. Metal edge strips in 6-inch (150-mm) lengths.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product, signed by product manufacturer.

D. Material Test Reports: For each tile-setting and -grouting product.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.2 TILE PRODUCTS

A. Floor and Wall Tile: Glazed ceramic wall tile (Restrooms)
1. BASIS-OF-DESIGN: CROSSVILLE CROSS-COLORS MINGLES, color selection from full range of colors.

2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
   a. American Olean; Division of Dal-Tile International Inc.
   b. Daltile; Division of Dal-Tile International Inc.
   c. Florida Tile Industries, Inc.
   d. Seneca Tiles, Inc.
   e. Trinity Tile Group
   f. United States Ceramic Tile Company.

3. Module Size: 6”x6”.
4. Thickness: 5/16 inch (8 mm).
5. Face: Pattern of design indicated, with manufacturer's standard edges.
6. Finish:
   a. Wall: Polished.
   b. Floor: Unpolished
7. Tile Color and Pattern: Two colors: As selected by Architect from manufacturer's full range.
8. Grout Color: As selected by Architect from manufacturer's full range.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.

B. Marble Thresholds: ASTM C 503, with a minimum abrasion resistance of 10 12 per ASTM C 1353 or ASTM C 241 and with honed finish.

1. Description: Uniform, fine- to medium-grained white stone with gray veining.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, in maximum lengths available to minimize end-to-end butt joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. C-Cure; C-Cure Board 990.
b. Custom Building Products; Wonderboard.
c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
d. USG Corporation; DUROCK Cement Board.

2. Thickness: 5/8 inch (15.9 mm).

B. Latex-Portland Cement: Flexible mortar consisting of cement-based mix and latex additive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Boiardi Products; a QEP company; Elastiment 323 Cement Based Waterproofing, Anti-Fracture/Crack Suppression Membrane.
b. C-Cure; UltraCure 971.
c. MAPEI Corporation; Mapelastic (PRP 315).
d. Southern Grouts & Mortars, Inc.; Southcrete 1100.
e. TEC; a subsidiary of H. B. Fuller Company; Triple Flex Waterproofing, Crack Isolation Membrane & Mortar.

2.5 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. PVC Sheet: Two layers of PVC sheet heat-fused together and to facings of nonwoven polyester; 0.040-inch (1.01-mm) nominal thickness.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Compotite Corporation; Composeal Gold.

2.6 SETTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils (0.1 mm) thick.
2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches (50.8 by 50.8 mm) by 0.062-inch (1.57-mm) diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
3. Expanded Metal Lath: Diamond-mesh lath complying with ASTM C 847.

    a. Base Metal and Finish for Interior Applications: Uncoated or zinc-coated (galvanized) steel sheet, with uncoated steel sheet painted after fabrication into lath.
    b. Base Metal and Finish for Exterior Applications: Zinc-coated (galvanized) steel sheet.
    c. Configuration over Studs and Furring: Flat.
    d. Configuration over Solid Surfaces: Self furring.
    e. Weight: 2.5 lb/sq. yd. (1.4 kg/sq. m) 3.4 lb/sq. yd. (1.8 kg/sq. m).

4. Latex Additive: Manufacturer's standard acrylic resin or styrene-butadiene-rubber water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

B. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

1. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Boiardi Products; a QEP company.
    b. Bonsal American; an Oldcastle company.
    c. Bostik, Inc.
    d. C-Cure.
    e. Custom Building Products.
    f. Jamo Inc.
    g. Laticrete International, Inc.
    h. MAPEI Corporation.
    i. Southern Grouts & Mortars, Inc.
    j. Summitville Tiles, Inc.
    k. TEC; a subsidiary of H. B. Fuller Company.

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.

C. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Boiardi Products; a QEP company.
    b. Bonsal American; an Oldcastle company.
    c. Bostik, Inc.
    d. C-Cure.
    e. Custom Building Products.
    f. Jamo Inc.
    g. Laticrete International, Inc.

h. MAPEI Corporation.
i. Mer-Kote Products, Inc.
j. Southern Grouts & Mortars, Inc.
k. Summitville Tiles, Inc.
l. TEC; a subsidiary of H. B. Fuller Company.

2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.7 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.

B. Standard Cement Grout: ANSI A118.6.

C. Polymer-Modified Tile Grout: ANSI A118.7.

1. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.

2.8 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 079200 "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

2.9 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

C. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F (49 to 60 deg C) per ASTM D 87.
2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.

2.10 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with adhesives bonded mortar bed or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

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

3.3 TILE INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

    a. Exterior tile floors.
    b. Tile floors in wet areas.
    c. Tile swimming pool decks.
    d. Tile floors in laundries.
    e. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
    f. Tile floors composed of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
2. Quarry Tile: 3/8 inch (9.5 mm).
3. Glazed Wall Tile: 1/16 inch (1.6 mm).
4. Decorative Thin Wall Tile: 1/16 inch (1.6 mm).

G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

I. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).

J. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

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

3.4 TILE BACKING PANEL INSTALLATION

A. Install cementitious backer units and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

B. Waterproofing shall be installed at all wet areas and especially at showers.

C. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.7 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 093000

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
   1. Gypsum board.
   2. Exposed existing metal.
   3. Hollow metal doors and frames

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Samples: For each finish and for each color and texture required.
   1. Submit samples on rigid backing, 8-inches (200 mm) square.
   2. Step coats on samples to show each coat required for system.
   3. Label each coat of each sample.
   4. Label each sample for location and application area.
C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
B. Source Limitations: Obtain block filler and primers for each coating system from the same manufacturer as the finish coats.
C. MPI Standards:
   1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
   2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.4 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
   1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:
   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

3. Verify make-up of existing paint substrate for compatibility with new paint.

B. Colors: As selected by Architect.

2.2 BLOCK FILLERS

A. Interior/Exterior Latex Block Filler: MPI #4.
   1. VOC Content: E Range of E2 (51-100 g/l).
   2. Manufacturer and Product:
      a. Benjamin Moore; Moorcraft; Super Craft Latex Block Filler.
      b. Benjamin Moore; MooreSpec; Int/Ext Latex Block Filler.
      c. ICI Paints; Devoe Coatings; Bloxfil Acrylic Block Filler.

2.3 PRIMERS/SEALERS

A. Interior Latex Primer/Sealer: MPI #50.
   1. VOC Content: E Range of E2 (51-100 g/l).
   2. Manufacturer and Product:
      a. Benjamin Moore; Regal; First Coat Latex Primer/Undercoater.
      b. ICI Paints; Devoe Paint; Primz220 Int. Latex High-Hiding Wall Primer Sealer.
      c. ICI Paints; Prep & Prime; Hi-Hide Wall Interior Water-Based Primer Sealer.
      d. ICI Paints; Prep & Prime; PVA Interior Water-Based Primer.

2.4 METAL PRIMERS

A. Anti-Corrosive Drying Alkyd Metal Primer: MPI #79
   1. VOC Content: E Range of E1 (351-450 g/l)
   2. Manufacturer and Product:
      a. Benjamin Moore; Industrial; Alkyd Metal Primer.
      b. Benjamin Moore; Ironclad; Alkyd Low Lustre Metal & Wood Enamel
      c. Benjamin Moore; Moorcraft; Super Spec DTM Alkyd Low Lustre Enamel
      d. ICI Paints; Devoe Coatings; Devguard T & S Primer.
      e. ICI Paints; Devguard; Alkyd Metal Primer.

2.5 LATEX PAINTS

A. Interior Latex (Eggshell): MPI #54 (Gloss Level 5).
   1. VOC Content: E Range of E2 (101-150 g/l).
   2. Manufacturer:
      a. Benjamin Moore; Regal; Aquavelvet Interior Latex Eggshell
      b. ICI Paints; Ralph Lauren; Interior Satin Exceptional Quality Acrylic Latex.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Masonry (Clay and CMU): 12 percent.
   2. Gypsum Board: 12 percent.
C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
   1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION AND APPLICATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
   2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
C. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer’s written instructions.
D. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
E. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
   1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   2. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, clean with solvents recommended by paint manufacturer, and tough up with same primer as the shop coat.
F. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
G. Apply paints according to manufacturer’s written instructions.
   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 dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of durable paint film.
   5. Provide finish coats that are compatible with primers used.
   6. The term “exposed surfaces” includes areas visible when permanent or built-in-fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
   7. Plant interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
   8. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
   9. Sand lightly between each succeeding enamel or varnish coat.
H. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

I. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
   1. Mechanical Work:
      a. Uninsulated metal piping.
      b. Uninsulated plastic piping.
      c. Pipe hangers and supports.
      d. Tanks that do not have factory-applied final finishes.
      e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
      f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
      g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
   2. Electrical Work:
      a. Switchgear.
      b. Panelboards.
      c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

J. 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.

K. Provide “Wet Paint” signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

L. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.3 INTERIOR PAINTING SCHEDULE

A. CMU Substrates:
   1. Latex System: MPI INT 4.2A.
      a. Prime Coat: Interior/exterior latex block filler.
      b. Intermediate Coat: Interior latex matching topcoat.
      c. Topcoat: Interior latex (semi-gloss).

B. Gypsum Board Substrates:
   1. Latex System: MPI INT 9.2A.
      a. Prime Coat: Interior latex primer/sealer.
      b. Intermediate Coat: Interior latex matching topcoat.
      c. Topcoat: Interior latex (semi-gloss).

C. Steel Substrates:
   1. Latex System: MPI INT 5.1Q
      a. Prime Coat: Anti-Corrosive alkyd metal primer.
      b. Intermediate Coat: Interior latex matching topcoat.
      c. Topcoat: Interior latex (semi-gloss).

END OF SECTION 09 91 23

SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Panel signs.
2. See attached “Exhibit 9” – **MATCH EXISTING SIGNAGE AND COLORS**

1.2 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. The University of West Florida has established a standard for interior signage. See UWF Facilities Services Building Design and Construction Standards for the current guidelines. All signage / signage schedule must be approved by Director of Space Management, UWF Project Manager, and Project Architect.

B. Recycled Content: Provide manufacturer’s documentation indicating separate percentages, by weight, of post-consumer and pre-consumer recycled content. Also include material costs, excluding cost of installation.

C. Local/Regional Materials: Provide manufacturer’s documentation indicating location of manufacturing facility and location where the base materials were extracted, mined, quarried, harvested, etc. Include address and distance to the project site for both manufacture and harvest. Also include material costs, excluding cost of installation.

D. VOC Content: Provide manufacturer’s product data and material safety data sheets (MSDS) for adhesives and sealants used on the interior of the building including printed statement of VOC content in g/L.

E. Shop Drawings: Show fabrication and installation details for signs.

1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.

F. Samples: For each sign type and for each color and texture required.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and The Florida Building Code.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

2.2 PANEL SIGNS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. APCO Graphics, Inc.
2. Fastsigns.

B. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner, complying with the following requirements:

1. Acrylic Sheet: 0.125 inches thick.
2. Edge Condition: Bullnose.
3. Corner Condition: Rounded to radius indicated.
4. Mounting: Unframed.

    a. Wall mounted with SS Phillips head screws.

5. Color: Match colors of existing signage in school.
6. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch (0.8 mm) above surface with contrasting colors.

C. Tactile and Braille Sign: Manufacturer's standard monolithic process for producing text and symbols in a homogeneous plaque sign complying with ADA-ABA Accessibility Guidelines and with ICC/ANSI A117.1. (Signs made of glued or fused separate lettering and numbers are not acceptable.) Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges free from burrs and cut marks; Braille dots with domed or rounded shape.

1. Panel Material: Opaque acrylic sheet.
2. Raised-Copy Thickness: Not less than 1/32 inch (0.8 mm).

D. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are UV and water resistant for five years for application intended.

E. All sign that are visible to students shall be of the same material and design. This includes signs specified in the Mechanical and Electrical sections.

2.3 ACCESSORIES

A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.4 ACRYLIC SHEET FINISHES

A. Colored Coatings for Acrylic Sheet: For copy and background colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.

B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.

1. Mechanical Fasteners: Use removable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

END OF SECTION 10 14 00

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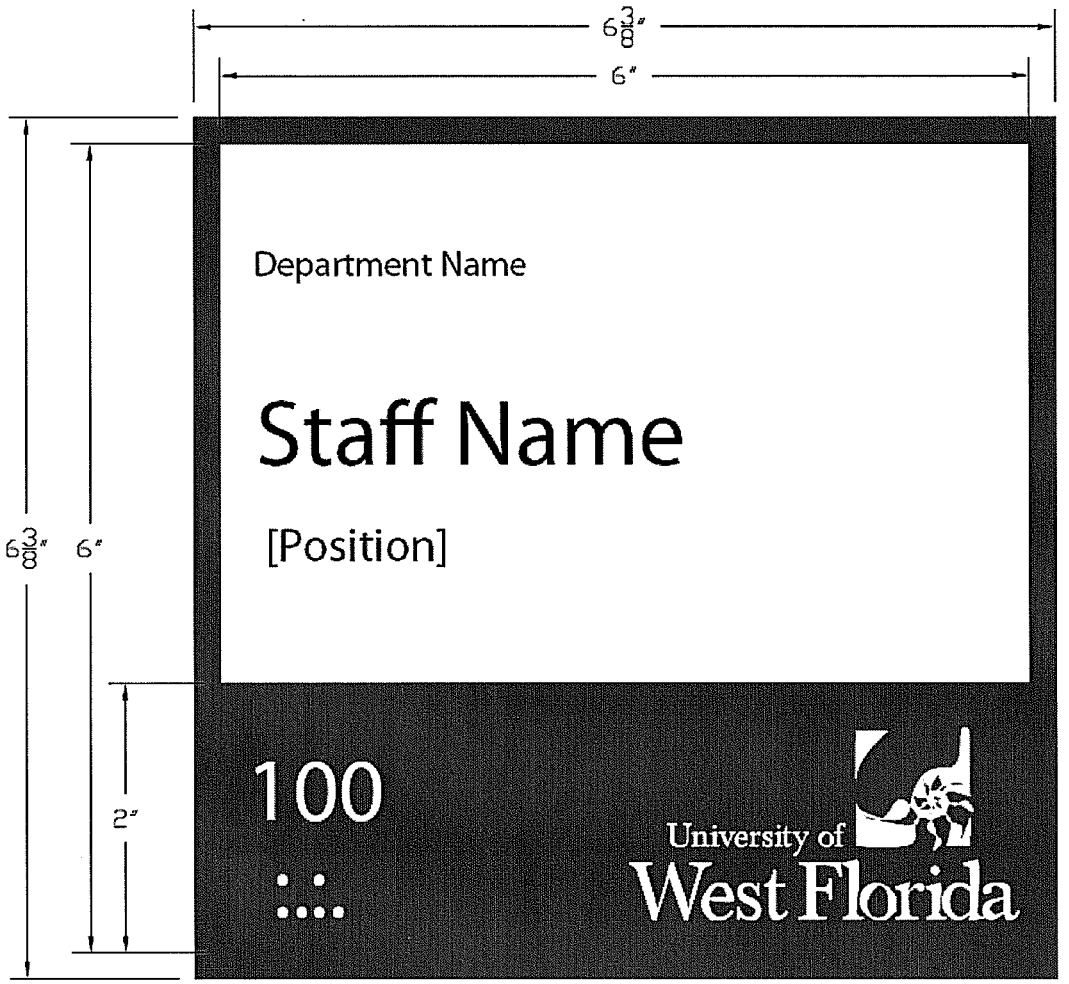
EXHIBIT 9

INTERIOR SIGNAGE



GENERAL NOTES:

Signs are equivalent to APCO type A signage.

Frame:
Size: 6 3/8" x 6 3/8"
Color: Medium Grey

ADA:
Size: 6" x 2"
Color: Medium Grey
Tactile/Braille Text: 5/8" or greater as per ADA specs
Logo: UWF Standard logo

Removable Cover:
Size: 6" x 6"
Color: Clear Plastic

Paper Insert:
Size: 6" x 6"
Color: White

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes toilet compartments and screens as follows:

1. Type: Solid-plastic, polymer resin.
2. Compartment Style: Overhead braced and floor anchored.
3. Screen Style: Floor and wall anchored.

1.2 SUBMITTALS

A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware, and fastenings.

B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of reinforcement and cutouts for compartment-mounted toilet accessories.

C. Samples for Initial Selection: Manufacturer's color charts consisting of sections of actual units showing the full range of colors, textures, and patterns available for each type of compartment or screen indicated.

1.3 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Capital Partitions, Inc.
2. Ampco Products, Inc
3. Santana Products, Inc.

2.2 MATERIALS

A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are unacceptable.

B. Solid-Plastic, Polymer Resin: High-density polyethylene (HDPE) with homogenous color throughout. Provide material not less than 1 inch (25 mm) thick with seamless construction and eased edges in color and pattern as follows:

1. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range of Designer series colors and patterns with lightly speckled finish.

C. Pilaster Shoes and Sleeves (Caps): ASTM A 666, Type 302 or 304 stainless steel, not less than 0.0312 inch (0.8 mm) thick and 3 inches (75 mm) high, finished to match hardware.

D. Full-Height (Continuous) Brackets: Manufacturer's standard design for attaching panels and screens to walls and pilasters of the following material:
1. Material: Stainless steel.

E. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:
1. Material: Stainless steel.

F. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile in manufacturer's standard finish.

G. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip in manufacturer's standard finish.

H. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match hardware, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.3 FABRICATION

A. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories, and grab bars, as indicated.

1. Provide internal reinforcement in metal units for compartment-mounted hardware, accessories, and grab bars, as indicated.

B. Solid-Plastic, Polymer-Resin Compartments and Screens: Provide aluminum heat-sink strips at exposed bottom edges of HDPE units to prevent burning.

C. Overhead-Braced-and-Floor-Anchored Compartments: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

D. Floor-Anchored Screens: Provide pilasters and panels of same construction and finish as toilet compartments. Provide manufacturer's standard stainless steel anchoring assemblies complete

with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

E. Doors: Unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be handicapped accessible.

1. Hinges: Manufacturer's standard self-closing full-length continuous stainless steel piano hinge.
2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit with combination rubber-faced door strike and keeper designed for emergency access. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.
3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumpers at out-swinging doors or entrance screen doors.
5. Door Pull: Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides of doors at compartments indicated to be handicapped accessible. Provide additional pull on inside of door at hinge side within accessible compartments.

2.4 STAINLESS-STEEL SHEET FINISHES

A. General: Comply with NAAM's "Metal finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

1. Remove or blend tool and die marks and stretch lines into finish.
2. Grind and polish surfaces to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

B. Finish: Manufacturer's standard #3 or #4 directional polish.

C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

D. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, plumb, and level. Provide clearances of not more than 1/2 inch (13 mm) between pilasters and panels and not more than 1 inch (25 mm) between panels and walls. Secure units in position with manufacturer's recommended anchoring devices.

1. Secure panels to walls full-length attachment brackets. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

2. Secure panels to panels with not less than 2 stirrup brackets attached near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced-and-Floor-Anchored Compartments: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than 2 fasteners. Hang doors and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Screens: Attach with anchoring devices according to manufacturer's written instructions and to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.2 ADJUSTING AND CLEANING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.

B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 10 21 13

SECTION 10 28 00 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Provide toilet accessories as scheduled or indicated.

B. Owner Furnished/Contractor Installed Items:
1. Soap Dispensers.
2. Toilet Paper Dispensers.

C. Contractor Furnished/Contractor Installed Items:
1. Mirrors.
2. Sanitary Napkin Waste Receptacle; provide one in each female stall
3. Grab Bars; ADA Compliant where applicable.
4. Underlavatory Guard.
5. Waste Receptacle.
6. Clothes Hook.

1.02 SUBMITTALS

A. Submit for approval product data, accessory schedule.

1.03 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

A. As indicated on TOILET ACCESSORIES schedule on drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated. Coordinate with work of other sections.

B. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

C. Restore damaged finishes and test for proper operation. Clean and protect work from damage.

END OF SECTION 10 28 00

SECTION 22 00 00 – PLUMBING

PART 1 - GENERAL

1.1 Scope of Work: The work covered by this section consists of providing all labor, equipment and materials and performing all operations necessary for the installation of a new plumbing system complete with hot and cold domestic water supply piping, waste and vent piping, fixtures, and domestic water heater(s). This section shall cover all work inside the building to approximately 5 feet outside of building walls. Piping beyond 5 feet outside of the building walls shall be provided under the "Civil" sections of this specification.

1.2 References to Other Sections:

1.2.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Divisions 00 and 01 Specification sections, apply to work of this section. Division 23 Basic Mechanical Materials and Methods sections (Sections 23 05 00.xx) also apply to work of this section.

1.2.2 Refer to Section 23 07 00 "Mechanical Insulation" for piping insulation.

1.3 Submittals:

1.3.1 Submit the following product data. Annotate manufacturer's descriptive data to show specific model, type, and size of each item.

1. Potable water supply pipe and fittings
2. Waste and vent pipe and fittings
3. Valves
4. Strainers
5. Drains
6. Water hammer arrestors
7. Pipe hangers and supports
8. Plumbing fixtures
9. Point-of-use mixing valves

PART 2 - PRODUCTS

2.1 Potable Water Piping System:

2.1.1 Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching pipe materials used in potable water systems. Where more than one type of material or product is indicated, selection is Installer's option.

2.1.1.1 Piping interior to the building shall be copper tube, ASTM B 88 Type L hard-drawn temper with wrought copper joints and solder joints when above grade. Underground piping inside the building footprint shall be ASTM B88 Type K, soft-annealed copper and shall be routed inside a thin-walled polyvinylchloride (PVC) pipe conduit. No joints will be allowed below the floor.

2.1.1.2 Joints shall be ANSI B16.18 or ANSI B16.22 solder joint fittings using silver solder and flux containing not more than 0.2 percent lead.

2.1.2 Valves shall be installed where indicated on the drawings and in water supplies to all equipment and fixtures.

2.1.2.1 Ball valves 2-1/2 inches and smaller; MSS SP-80, Class 125 bronze 2 piece body with bronze

ball and stem, Teflon seats and seals, and full port opening with solder or threaded ends. Select with port area equal to or greater than connecting pipe area, include seat ring designed to hold sealing material. Butterfly valves shall be used in lieu of ball valves in piping 3 inches and larger.

2.1.2.2 Point of use mixing valves; ASSE 1070, thermostatic mixing valve. Bronze body, copper encapsulated thermostat, brass and engineered polymer internals, stainless steel spring, locking, tamper-resistant temperature adjustment knob, integral check valves on inlets, MIPS connections and rough bronze finish.

2.1.3 Strainers; Class 125, Style Y with blow off outlet and pipe nipple and gate valve with discharge pipe nipple.

2.1.4 Water hammer arrestors; provide bellows type water hammer arrestors with stainless steel casing and bellows, pressure rated for 250 psi, tested and certified in accordance with PDI Standard WH-201.

2.2 Drain, Waste and Vent (DWV) Piping System:

2.2.1 Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in soil and waste systems. Where more than one type of material or product is indicated, selection is Installer's option.

2.2.1.1 Aboveground DWV piping shall be of the following materials:

1. Copper tube; Type DWV; cast-bronze fittings, drainage pattern, 50-50 solder joints. Use copper tube for waste arms only. Connections to tapped cast iron fittings shall be made with C X MPT DWV soil pipe adapters. Connections to hub-cast iron fittings shall be made with C X SPIGOT DWV soil pipe adapters. Connections to no hub cast-iron fittings shall be made with C X NO HUB DWV soil pipe adapters.
2. Cast-iron hub-and-spigot soil pipe; service weight with cast-iron hub-and-spigot soil pipe fittings and lead and oakum joints.
3. Cast-iron hub-and-spigot soil pipe with cast-iron hub-and-spigot soil pipe fittings and compression gasket joints.
4. Hubless cast-iron soil pipe; service weight with hubless cast-iron soil pipe fittings and hubless joints.
5. Polyvinylchloride (PVC) plastic pipe; Type DWV; PVC plastic type DWV socket-type fittings with solvent cement joints. Do not use plastic pipe where exposed, in fire-rated assemblies or return air plenums. Refer to the Architectural (Life Safety) drawings for fire-rated assemblies and to the Mechanical drawings for return air plenum locations.

2.2.1.2 Underground building drain piping within 5 feet of the building shall be of the following materials:

1. Cast-iron hub-and-spigot soil pipe; service weight with cast-iron hub-and-spigot soil pipe fittings and lead and oakum joints.
2. Cast-iron hub-and-spigot soil pipe with cast-iron hub-and-spigot soil pipe fittings and compression gasket joints.
3. Piping sized 6" and smaller may be PVC sewer pipe; Type DWV, socket-type.

2.2.1.3 For buried pipe, provide manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide green tape with black or white printing reading "CAUTION SEWER LINE BURIED BELOW".

2.3 Miscellaneous Piping Materials:

2.3.1 Pipe nipples; ASTM A733, copper alloy for use in copper tubing and hot-dip galvanized Schedule 80 steel pipe for use in steel piping. All-threaded pipe nipples will not be allowed.

2.3.2 Flanges; ANSI B16.1, Class 125 for use in ferrous piping and ANSI B16.22 or ANSI B16.24 for use in copper tubing. Provide flanges with full face flat type synthetic rubber gaskets.

2.3.3 Escutcheon plates; one piece or split hinge type metal plates for piping passing through floors, walls, and ceilings in exposed spaces. Provide chromium-plated finish on copper alloy plates in finished spaces. Paint finish on plates in unfinished spaces. Provide with set screws or other approved positive means to anchor plates in place securely.

2.3.4 Pipe sleeves shall be as follows:

2.3.4.1 Sleeves in masonry and concrete walls, floors, and roofs shall be ASTM A 53, Schedule 40 or standard weight, hot-dip galvanized steel pipe sleeves. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when the cavities in the core-drilled holes are completely grouted smooth.

2.3.4.2 Sleeves in walls, floors, and roofs constructed from materials other than masonry or concrete shall be hot-dip galvanized steel sheet having a nominal weight of not less than 0.90 pound per square foot. Provide 26 gauge galvanized steel sheet.

2.3.5 Pipe hangers and supports; provide MSS SP-58 and MSS SP-69, Type 1 or 6 adjustable type, except as modified herein or indicated otherwise. Attachments to steel W or S beams shall be with Type 21, 28, 29, or 30 clamps. Attachments to steel angles and channels (with web vertical) shall be with Type 20 clamp with a beam clamp channel adaptor. Attachments to steel channel (with web horizontal) shall be with drilled hole on centerline and double nut and washer. Attachments to concrete shall be with Type 18 insert or a drilled hole with expansion anchor. Hanger rods and attachments shall be full size of the hanger-threaded diameter. Provide Type 40 insulation protection shields for insulated piping. Provide steel support rods and nonmetallic, hair felt, or plastic piping isolators between copper tubing and the hangers.

2.3.6 Access doors; provide 12”x12” factory prefabricated and primed flush face steel access doors including steel door frame with continuous hinges and turn-screw-operated latch. Doorframe shall be for installation in plaster and masonry walls. Furnish doors under this section to provide proper access to concealed valves and install under the appropriate section of this specification.

2.4 Plumbing Fixtures:

2.4.1 Provide factory-fabricated fixtures of type, style and material indicated on the drawings. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by manufacturer, and as required for complete installation. Where more than one type is indicated, selection is Installer's option; but all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations. Refer to the plumbing fixture schedule on the drawings for more information.

2.4.2 All exposed water supply piping to each fixture shall be chrome plated.

2.4.3 All exposed piping under lavatories or sinks intended for use by handicapped people shall be insulated. Where multiple lavatories are mounted in a counter, all exposed piping under all lavatories using hot water shall be insulated. Insulation shall be fully molded, foam rubber

insulation, 1/2” nominal thickness and paintable. Insulation shall be self-extinguishing meeting ASTM D635. Fasteners may be nylon type.

PART 3 - EXECUTION

3.1 Potable Water Pipe Installation:

3.1.1 Examine areas and conditions under which potable water systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently-leak proof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections, within 1/16" misalignment tolerance. Comply with ANSI B31 Code for Pressure Piping.

3.1.2 Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown on the floor plans or described by diagrams, details and notations on the drawings. If not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanent-enclosure elements of building. Limit clearance to 1/2" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1" clearance outside insulation. Wherever possible in finished and occupied spaces, conceal piping from view, by locating in column enclosures, in hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as indicated. Install piping to allow for expansion and contraction.

3.1.3 Pipe routed in exterior walls shall be installed on building side of wall insulation. Where interior construction is block, cut outside face of block and route pipe in depth of cavity and outside block wall thickness. Do not interrupt board type cavity wall insulation or vapor barrier.

3.1.4 Isolate all copper tubing from steel and concrete by wrapping the pipe at the contact point, and for one inch on each side, with at least two layers of plastic electrical tape.

3.1.5 Underground Piping shall be installed as follows:

1. Coat the following underground (uninsulated) pipes with a heavy coat of bitumastic: copper tubing, cast iron pipe (if not already coated), and ductile iron pipe (if not already coated).
2. Provide plastic tape markers over all underground utilities. Install underground plastic pipe markers during backfill, 6"-8" below grade.

3.1.6 Electrical equipment spaces; do not run piping through transformer vaults and other electrical or electronic equipment spaces and enclosures unless shown. Install drip pan under piping that must run through electrical spaces.

3.1.7 Cut pipe from measurements taken at the site, not from drawings. Keep pipes free of contact with building construction and installed work.

3.2 Drain, Waste, and Vent (DWV) Piping Installation:

3.2.1 Examine substrates and conditions under which soil and waste systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2.2 Install above-grade soil and waste piping in accordance with the paragraph “Potable Water Pipe Installation” in this section.

3.2.3 Install underground soil and waste pipes as indicated on the drawings. Lay underground piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Clean interior of piping and dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

3.2.4 Install building soil and vent piping pitched to drain at minimum slope of 1/4" per foot (2%) for piping 3" and smaller, and 1/8" per foot (1%) for piping 4" and larger.

3.2.5 Provide soil and waste piping runouts to plumbing fixtures and drains, with approved trap, of sizes indicated.

3.3 Pipe Joints:

3.3.1 Threaded joints; thread pipe in accordance with ANSI B2.1. Cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer and on male threads at each joint and tighten joint to leave not more than 3 threads exposed. Paint exposed threads to retard rusting.

3.3.2 Solder joints; solder copper tube-and-fitting joints in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply non-acid type solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

3.3.3 Braze copper tube-and-fitting joints in accordance with ANSI B.31.

3.3.4 Flanged joints; match flanges within piping system and at connection with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets. Bolts shall project 1/8" to 3/8" beyond nut face when tight.

3.3.5 Cast-iron joints; tightly pack joint with joint packing material. Do not permit packing to enter bore of finished joint. Clean joint after packing. Fill remaining joint space with one pouring of lead to indicated minimum depth measured from face of bell. After lead has cooled, calk joint tightly by use of hammer and calking iron. If using compression joints, comply with manufacturer’s installation instruction using gaskets and lubricant furnished specifically for this duty.

3.3.6 Hubless cast-iron joints; comply with coupling manufacturer's installation instructions.

3.3.7 Plastic pipe joints; comply with manufacturer's instructions and recommendations, and with applicable industry standards.

1. Solvent-cemented joints shall be made in accordance with ASTM D-2235 and ASTM F-402.
2. PVC sewer pipe bell/gasket joints shall be installed in accordance with ASTM D-2321.

3.4 Pipe Hangers:

3.4.1 Provide additional supports at the concentrated loads in piping between supports, such as for inline water pumps and flanged valves. Provide supports at each change in direction of piping.

3.4.2 Piping to receive insulation; provide temporary wood spacers between the insulation protection shield and the pipe in order to properly slope the piping and to establish final elevations. Temporary wood spacers shall be of the same thickness as the insulation to be provided under another section of this specification.

3.4.3 Maximum spacing between supports on straight pipe runs shall be as follows:

1. Vertical piping: Support piping at each floor, but at not more than 10-foot intervals, with pipe riser clamps or offset pipe clamps.
2. Horizontal Piping: Support cast-iron piping at 5-foot intervals, except for pipe exceeding 5-foot length, provide supports at intervals equal to the pipe length but not exceeding 10 feet. Support steel piping and copper tubing as follows:

MAXIMUM SPACING

Nominal Pipe Size	Under 1”	1-1/4”	1-1/2”	2”	2-1/2”	3”	4”	5”	6”
Steel Pipe	7 feet	8 feet	9 feet	10 feet	11 feet	12 feet	14 feet	16 feet	17 feet
Copper Tubing	6 feet	7 feet	8 feet	8 feet	9 feet	10 feet	12 feet	13 feet	14 feet

3.5 Pipe Sleeves: Provide pipe sleeves where piping passes through walls, floors, roofs, and partitions. Secure sleeves in proper position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, floors, roofs, and partitions. Provide not less than 1/4 inch space between exterior of piping or pipe insulation and interior of sleeve or core-drilled hole. Firmly pack space with mineral wool insulation and caulk at both ends of the sleeve or core-drilled hole with plastic waterproof cement, which will dry to a firm but pliable mass, or provide a mechanically adjustable segmented elastomeric seal. Seal both ends of penetrations through firewalls and fire floors to maintain fire resistive integrity with UL listed fill, void, or cavity material. Extend sleeves in floor slabs 3 inches above the finished floor, except sleeves are not required where DWV piping passes through concrete floor slabs located on grade.

3.6 Water Hammer Arrestors: Install in upright position, in locations and of sizes in accordance with PDI Standard WH-201.

3.7 Plumbing Fixtures:

3.7.1 Examine roughing-in work of potable water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.7.2 Install plumbing fixtures of types indicated where shown and at indicated heights, in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Furnish templates for cut-outs in countertops. Coordinate exact fixture locations with countertop shop drawings.

3.7.3 Fasten plumbing fixtures securely to indicated supports or building structure and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid and not subject to pull or push movement.

3.7.4 Install stop valve in water supply to each fixture.

3.7.5 For wall-mounted fixtures, after fixtures are set, the crack between the fixture and wall shall be caulked with DAP silicone-based caulking, or approved equivalent.

3.7.6 Protect installed fixtures from damage during remainder of construction period.

3.7.7 Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance, otherwise remove and replace with new units and proceed with retesting.

3.7.8 Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site, otherwise remove fixture and replace with new unit. Feasibility and match to be judged by Architect/Engineer. Remove cracked or dented units and replace with new units.

3.7.9 Clean plumbing fixtures, trim, aerators, and strainers of dirt and debris upon completion of installation. Adjust water pressure at drinking fountains, faucets, shower valves, and flush valves to provide proper flow stream and specified gpm. Adjust or replace washers to prevent leaks at faucets and stop.

3.8 Field Quality Control:

3.8.1 Inspections; prior to initial operation, inspect piping system for compliance with drawings, specifications, and manufacturer's submittals.

3.8.2 Field testing; before final acceptance of the work, test each system as in service to demonstrate compliance with the contract requirements. Perform the following tests in addition to the tests specified in the Pluming Code. Correct defects in the work provided by the Contractor, and repeat tests until work is in compliance with contract requirements.

1. Potable water piping: Before applying insulation, hydrostatically test each piping system at not less than 100 psig with no leakage or reduction in gauge pressure for 2 hours.
2. DWV piping: Before the installation of fixtures, cap ends of each system, fill piping with water to the roof, and allow to stand until a thorough inspection has been made. If the system is tested in sections, each opening shall be plugged and each section tested with not less than a 10 foot head or water. After plumbing fixtures have been set and their traps filled with water, subject the entire sanitary system to a final air pressure test of not more than 1.0 inch of water column. The entire system shall be proven absolutely tight under such test.

3.9 Disinfection: After pressure tests have been made, the entire potable hot and cold water distribution system shall be sterilized. The system shall be thoroughly flushed with water of sufficient velocity until all entrained dirt and other foreign material have been removed before introducing chlorinating material. The chlorinating material shall be hypochlorite or liquid chlorine. Water chlorination procedure shall be in accordance with AWWA M20 and C651. The chlorinating material shall be fed into the water piping system at a constant rate at a concentration of at least 50 parts per million (ppm). A properly adjusted hypochlorite solution injected into the main with a hypochlorinator, or liquid chlorine injected into the main through a solution-feed chlorinator and booster pump, shall be used. The chlorine residual shall be checked at intervals to ensure that the proper level is maintained. Chlorine application shall continue until the entire main is filled. The water shall remain in the system for a minimum of 24 hours. Each valve in the system being sterilized shall be opened and closed several times during the contact period to ensure its proper disinfection. Following the 24-hour period, no more than 0.2 ppm chlorine residual shall remain in the system. During the flushing period each valve and faucet shall be opened and closed several times.

END OF SECTION 22 00 00

SECTION 23 05 00.00 – GENERAL MECHANICAL

PART 1 - GENERAL

1.1 Scope of Work: The work covered by this division consists of providing all labor, equipment and materials and performing all operations necessary for the installation of the mechanical work as herein called for and shown on the drawings. The work shall include but shall not be limited to the following:

Modify existing plumbing systems in Building 18 on the campus of The University of West Florida in Pensacola, Florida.

1.2 References to Other Sections: General and Special Conditions, General Requirements, and all other parts of the Contract Documents shall be binding upon the contractor and shall apply to all work specified in Divisions 22 and 23. This section applies to all sections of Divisions 22 and 23 Plumbing" and "Mechanical" of this project specification, unless specified otherwise in the individual section.

1.3 Project Coordination: Contractor shall review all architectural and structural drawings to be aware of conditions affecting work herein. *This project is a renovation and requires the replacement of existing ductwork and piping. The contractor shall visit the site prior to submitting a bid to become acquainted with the actual conditions and clearances in the field.*

1.4 Definitions:

1. Provide: Furnish and install, complete and ready for intended use.
2. Furnish: Supply and deliver to project site, ready for subsequent requirements.
3. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, and protecting, cleaning, and similar requirements.

1.5 Permits and Fees: The contractor shall obtain and pay for all permits, fees for inspection, and any other charges that may be necessary for fully completing the work. The contractor shall make all necessary tests required by the City, County, and/or State authorities, legal regulations, and/or the Architect/Engineer and return to the Architect/Engineer any certificates of approval issued and signed by the inspector in charge of each particular part of the work.

1.6 Responsibility of the Bidder: Each bidder shall visit the site of the proposed work and fully acquaint himself with the conditions relating to the construction requirements so that he may fully understand the facilities, difficulties, and restrictions contingent upon the execution of the work under this contract. The failure or omission of any bidder to receive or examine form instrument, addendum, or other document shall in no way relieve the bidder from his obligations with respect to his bid or the contract. The submission of a bid shall be taken as prima facie evidence of compliance with this paragraph and that the bidder has included in his proposal every item of cost necessary for a complete installation strictly as planned, specified, and intended.

1.7 Verification of Owner's Survey Data: Prior to commencing any excavation or grading, the contractor shall satisfy himself as to the accuracy of all survey data as indicated in these plans and specifications and/or as provided by the Owner. Should the Contractor discover any inaccuracies, errors, or omissions in the survey data, he shall immediately notify the Architect/Engineer in order that proper adjustments can be anticipated and ordered. Commencement by the contractor of any excavation or upgrading shall be held as an acceptance of the survey data by him after which time the contractor has no claim against the Owner resulting from alleged errors, omissions or inaccuracies of the said survey data.

1.8 Delivery and Storage of Materials: Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. All material shall be stored to provide

protection from the weather and accidental damage.

1.9 Minimum Requirements: Requirements specified herein are a minimum. All equipment, when installed, shall perform equal to or shall exceed the specified requirements. Extent of work is indicated by the drawings, schedules, and the requirements of the specifications. Singular references shall not be construed as requiring only one device if multiple devices are shown on the drawings or are required for proper system operation.

1.10 Information in Other Divisions: The intent of these drawings and specifications is to obtain a complete and satisfactory installation. Separate divisional drawings and specifications shall not relieve the contractor or subcontractors from full compliance of work of his trade indicated on any of the drawings or in any section of the specifications.

1.11 Field Measurements and Coordination:

1.11.1 The contractor shall verify all dimensions and equipment locations in the field to insure a close, neat fit with other trades' work. The contractor shall also make use of all contract documents and approved shop drawings to verify exact dimension and locations.

1.11.2 The contractor shall coordinate work in this division with all other trades in proper sequence to insure that the total work is completed within contract time schedule and with a minimum cutting and patching.

1.11.3 The contractor shall locate all apparatus symmetrical with architectural elements. Equipment, ductwork, and/or piping shall be installed to exact height and locations when shown on mechanical, plumbing, or architectural drawings. When locations are shown only on mechanical and/or plumbing drawings, the contractor shall be guided by architectural details and conditions existing at job and correlate this work with that of others.

1.11.4 The contractor shall install work as required to fit structure, avoid obstructions, and retain clearance, headroom, openings and passageways. No structural members may be cut without written approval.

1.11.5 The contractor shall carefully examine any existing conditions, piping, electrical conduit, and premises. The contractor shall compare the drawings with existing conditions and report any discrepancies as soon as they are observed. Written instructions can then be issued to resolve discrepancies.

1.11.6 Due to the differences between various manufacturers, it is not practicable to show exact dimensions or to show or specify all minor details of equipment. Because of the small scale of the drawings, it is not possible to indicate all offsets and fittings or to locate every accessory. The contractor shall provide all valves, fittings, and accessories as necessary for a complete installation, whether or not specifically mentioned or shown. Drawings are diagrammatic and are not to be scaled. The contractor shall carefully study the sizes and locations of structural members, wall and partition locations, trusses, and room dimensions and take actual measurements on the job site. The contractor shall locate piping, ductwork, equipment and accessories with sufficient space for installing and servicing. The contractor is responsible for the accuracy of his measurements and shall not order materials or perform work without verification. No extra compensation will be allowed because field measurements vary from the dimensions on the drawings. If field measurements show that equipment or piping cannot be fitted, the Architect/Engineer shall be notified immediately. The contractor shall remove and relocate, without additional compensation, any item that is installed and is later found to encroach on space assigned to another use.

1.12 Guarantee and Service:

1.12.1 The contractor shall guarantee labor, materials and equipment for a period of one (1) year from Substantial Completion, or from the owner's occupancy, whichever is earlier. Contractor shall

make good any defects and shall include all necessary adjustments to and replacement of defective items without expense to the Owner. Manufacturer warranties do not relieve the contractor of this responsibility.

1.12.2 The Owner reserves right to make emergency repairs as required to keep equipment in operation without voiding contractor's Guarantee Bond or relieving Contractor of his responsibilities during guarantee period.

1.12.3 The contractor shall provide service on all new equipment during the guarantee period without extra cost to the Owner.

1.13 Submittals:

1.13.1 Before ordering any materials or equipment, and within 30 days after the award of contract the contractor shall submit to the Architect/Engineer one complete schedule showing the make, type, manufacturer's name and trade designation of all equipment.

1. This schedule shall be accompanied by the required number of copies of the manufacturer's printed specifications and shop drawings for each piece of equipment or specialty and shall give dimensions, diagrams, descriptive literature, capacity or rating, kind of material, finish, guarantee, etc., and such other detailed information as the Architect/Engineer may require.
2. When approved, such schedule shall be an addition to the specifications herewith, and shall be of equal force in that no deviation will be permitted except with the approval of the Architect/Engineer.

1.13.2 If the shop drawings show variation from the requirements of the contract because of standard shop practice or other reasons, the contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, the contractor will not be relieved of the responsibility for executing the work in accordance with the contract.

1.13.3 Review of shop drawings, descriptive literature, catalog data, or schedules shall not relieve the contractor from responsibility for deviations from contract drawings or specifications, unless he has in writing called to the attention of the Architect/Engineer such deviation at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings, descriptive literature, catalog data, or schedules.

1.13.4 Submit shop drawings specifically called for in other sections of this specification. Shop drawings shall consist of plans, sections, elevations and details to scale (not smaller than 1/4" per foot), with dimensions clearly showing the installation. Direct copies of small scale project drawings issued to the Contractor are not acceptable. Drawings shall take into account equipment furnished under other sections and shall show space allotted for it. Include construction details and materials. Submit shop drawings as follows:

1.13.5 Submit product data specifically called for in other sections after award of the contract and before any equipment or materials are purchased. Product data are defined as manufacturer's printed literature specifically marked to indicate size and model and accompanied by rating sheets listing values showing that equipment meets scheduled or specified values. Properly coded stamp on submittal is required before ordering equipment.

PART 2 - PRODUCTS

2.1 Equipment and Materials:

2.1.1 Equipment and materials shall be new and the most suitable grade for the purpose intended. Equipment furnished under this division shall be the product of a manufacturer regularly engaged in the manufacture of such items for a period of three years. Where practicable, all of the components shall be products of a single manufacturer in order to provide proper

coordination and responsibility.

2.1.2 Each item of equipment shall bear a name plate showing the manufacturer's name, trade name, model number, serial number, ratings and other information necessary to fully identify it. This plate shall be permanently mounted in a prominent location and shall not be concealed, insulated or painted.

2.1.3 The label of the approving agency, such as UL, IBR, ASME, ARI, or AMCA, by which a standard has been established for each particular item, shall be in full view.

2.1.4 The equipment provided shall be a product of the manufacturer's latest design.

2.1.5 A service organization with personnel and spare parts shall be available within a radius of 100 miles for each type of equipment furnished.

2.1.6 Equipment shall be installed in accordance with the manufacturer's recommendations. Place in service by a factory trained representative where required.

2.1.7 Materials and equipment are specified herein by a single or by multiple manufacturers to indicate quality, material and type of construction desired. Manufacturer's products shown on the drawings have been used as basis for design. It shall be the Contractor's responsibility to ascertain that alternate manufacturer's products meet the specifications, and that the size and arrangement of the equipment is suitable for installation.

2.1.8 Catalog numbers and model numbers indicated in the drawings and specifications are used as a guide in the selection of the equipment and are only listed for the contractor's convenience. The contractor shall determine the actual model numbers for ordering materials in accordance with the written description of each item and with the intent of the drawings and specifications.

2.2 Requests for Substitution:

2.2.1 Where a particular system, product or material is specified by name, it shall be considered as standard basis for bidding, and base proposal on the particular system, product or material specified.

2.2.2 Requests by the contractor for substitution will be considered only when reasonable, timely, fully documented, and qualifying under one or more of the following circumstances.

1. The required product cannot be supplied in time for compliance with the contract time requirements.
2. The required product is not acceptable to governing authority, or determined to be non-compatible, or cannot be properly coordinated, warranted or insured, or has other recognized disabilities as certified by the contractor.
3. A substantial cost advantage is offered to the owner after deducting offsetting disadvantages, including delays, additional compensation for redesign, investigation, evaluation and other necessary services and similar considerations.

2.3 Prior Approval: Where the term "or approved equivalent" is used, submit all requests for approval of the alternate manufacturer's products minimum two weeks prior to bid opening. Approval will be in the form of an addendum to the specifications and drawings. Clearly indicate all differences between the specified and proposed product following the guidelines for substitution herein.

PART 3 - EXECUTION

3.1 Workmanship: All materials and equipment shall be installed and completed in a workmanlike manner and in accordance with the best modern methods and practice. Any materials installed which do not present an orderly and reasonably neat and/or workmanlike

appearance, or do not allow adequate space for maintenance, shall be removed and replaced when so directed by the Architect/Engineer.

3.2 Coordination:

3.2.1 The Contractor shall be responsible for full coordination of the mechanical systems with shop drawings of the building construction so the proper openings and sleeves or supports etc. are provided for piping, ductwork, or other equipment passing through slabs or walls.

3.2.2 The contractor shall provide all special foundations and supports for equipment, ductwork, and piping which are separate and distinct from the building construction as shown on the architectural drawings.

3.2.3 Any additional steel supports required for the installation of any mechanical equipment, piping, etc., shall be furnished and installed under the section of the specifications requiring the additional supports.

3.2.4 It shall be the Contractor's responsibility to verify all equipment such as valves, dampers, filters and such other apparatus or equipment that may require maintenance and operation are made easily accessible, regardless of the diagrammatic location shown on the drawings.

3.2.5 All connections to fixtures and equipment shown on the drawings shall be considered diagrammatic unless otherwise indicated by detail. The actual connections shall be made to fully suit the requirements of each piece of equipment and adequately provide for expansion and servicing.

3.2.6 The contractor shall protect equipment and fixtures at all times during construction. All equipment and fixtures which are damaged during construction shall be replaced with new.

3.2.7 Prior to starting and during progress of work, the contractor shall examine work and materials installed by others as they apply to work in this division. Contractor shall report conditions which may prevent satisfactory installation of his systems. Start of work will be construed as acceptance of suitability of work of others.

3.3 Interruption of Service: Before any equipment is shut down for disconnection or tie-ins, arrangements shall be made with the Architect/Engineer and this work shall be done at the time best suited to the Owner. This will typically be on weekends and/or holidays and/or after normal working hours. Services shall be restored the same day unless prior arrangements are made.

3.4 Cutting and Patching: Contractor shall notify the general contractor to do all cutting and patching of all holes, chases, sleeves, and other openings required for installation of equipment furnished and installed under this section. The contractor shall utilize experienced trades for cutting and patching.

3.5 Equipment Setting: Bolt equipment directly to concrete pads or vibration isolators as required, using hot-dipped galvanized anchor bolts, nuts and washers. All equipment shall be leveled.

3.6 Painting: Touch-up factory finishes on equipment located inside and outside shall be done under Divisions 22 and 23. The contractor shall obtain matched color coatings from the manufacturer and apply as directed. If corrosion is found during inspection on the surface of any equipment, contractor shall clean, prime, and paint as required.

3.7 Clean-up: The contractor shall thoroughly clean all exposed parts of apparatus and equipment of cement, plaster, and other materials and remove all oil and grease spots. Repaint or touch up as required to look like new. During progress of work, the contractor is to carefully clean up and leave premises and all portions of building free from debris and in a clean and safe condition. Brush out fins on all coils.

3.8 Start-up and Operational Test: Start each item of equipment in strict accordance with the manufacturer's instructions; or where noted under equipment specification, start-up shall be done by a qualified representative of the manufacturer. Alignment, lubrication, safety, and operating control shall be included in start-up check.

3.9 Climate Control: Operate heating and cooling systems as required after initial startup to maintain temperature and humidity conditions to avoid freeze damage and warping or sagging of ceilings and carpet. The one year warranty on equipment shall not begin until the date of Substantial Completion or the Owner's occupancy.

3.10 Record Drawings:

3.10.1 During the progress of the work, the Contractor shall record on his field set of drawings the exact location, as installed, of all piping, ductwork, equipment, and other systems which are not installed exactly as shown on the contract drawings.

3.10.2 Upon completion of the work, record drawings shall be prepared as described in the General Conditions, and Supplementary Conditions sections of these specifications.

3.11 Acceptance:

3.11.1 Punch List: The contractor shall submit written confirmation that all punch lists have been checked and the required work completed.

3.11.2 Instructions: Unless noted as otherwise in other sections of this division. At completion of the work, the contractor shall provide a competent and experienced person who is thoroughly familiar with project, for one day to instruct permanent operating personnel in operation of equipment and control systems.

3.11.3 Operation and Maintenance Manuals: Furnish four complete manuals bound in ring binders and organized by system or section. Manuals shall contain:

1. Detailed operating instructions and instructions for making minor adjustments.
2. Complete wiring and control diagrams.
3. Routine maintenance operations.
4. Manufacturer's catalog data, service instructions, and parts lists for each piece of operating equipment.

3.11.4 Control Diagrams: Frame under glass and mount on equipment room wall.

3.11.5 Test and Balance Report: Submit four certified copies.

3.11.6 Warranties: Submit copies of all manufacturers' warranties.

3.11.7 Record Drawings: Submit record drawings.

3.11.8 Valve Identification: Permanently tag valves with coded brass discs or engraved plastic tags attached with brass chain. Coordinate code with operating instructions. Rivet engraved plastic identification nameplates to electric switches, controls, and equipment. Stencil insulated piping with function. Color code non-insulated piping.

3.11.9 Acceptance: Acceptance will be made on the basis of tests and inspections of job. A representative of firm that performed test and balance work shall be in attendance to assist. Contractor shall furnish necessary mechanics to operate system, make any necessary adjustments and assist with final inspection.

END OF SECTION 23 05 00.00

SECTION 23 05 00.10 - CODES AND STANDARDS

PART 1 - GENERAL

1.1 References to Other Sections: All work under Divisions 22 and 23 shall be constructed in accordance with the codes listed herein. The design has been based on the requirements of these codes; and while it is not the responsibility of the contractor to verify that all work called for complies with these codes, he shall be responsible for calling to the Architect/Engineer's attention any drawings, details or specifications that are not in conformance with these or other codes. Codes or standards applying to a specific part of the work may be included in that section.

1.2 Default Code Compliance: Where no specific method or form of construction is called for in the contract documents, the contractor shall comply with code requirements when carrying out such work.

1.3 Conflicts in Various Codes: Where code conflict exists, the most restrictive requirement applies. Comply with current code edition, unless noted.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 Codes: Contractor shall comply fully with all applicable building codes including the following:

1. 2010 Florida Building Code – Building
2. 2010 Florida Building Code – Mechanical
3. 2010 Florida Building Code – Plumbing
4. NFPA 101 – Life Safety Code
5. Handicapped Accessibility, ANSI A117.1 and Florida Statute Chapter 553, Part V.
6. ADA – Americans with Disabilities Act of 1990.

3.2 Standards: All mechanical materials, installation and systems shall comply with the applicable standards written by the following organizations, including the latest addenda and amendments, to the extent referenced:

1. AMCA – Air Movement and Control Association
2. ANSI – American National Standards Institution
3. ASME – American Society of Mechanical Engineers
4. ASTM – American Society of Testing Materials
5. IBR – Standards of the Hydronic Institute

END OF SECTION 23 05 00.10

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SECTION 23 07 00 - MECHANICAL INSULATION

PART 1 - GENERAL

1.1 Scope of Work: The work covered by this section consists of providing all labor, equipment and materials and performing all operations necessary for the installation of insulation on all mechanical systems that require it.

1.2 References to Other Sections: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 00 AND 01 Specification sections, apply to work of this section. Division 23 Basic Mechanical Materials and Methods sections (Sections 23 05 00.xx) apply to work of this section.

1.3 Acceptable Manufacturers: CertainTeed, Knauf, Johns Manville, Armaflex, or approved equivalent.

1.4 Submittals: Manufacturer's data sheet for each product provided.

1.5 Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, coverings, sealers, mastic, and adhesive) with a flame spread rating of 25 or less, and a smoke-developed rating of 50 or less as tested by ANSI/ASTM 84.

PART 2 - PRODUCTS

2.1 Piping System Insulation Materials:

2.1.1 Insulation for piping systems shall be one of the following as indicated herein and on the drawings.

1. Fiberglass pipe insulation; ASTM C547, Class 1 unless otherwise indicated. Preformed sleeving with white all-service jacket, suitable for temperatures up to 450°F.
2. Flexible unicellular pipe insulation; ASTM C534, Type I. Tubular, suitable for use to 200°F.

2.1.2 Staples, bands, wires, and cement shall be as recommended by the insulation manufacturer for applications indicated.

2.1.3 Adhesives, sealers, and protective finishes shall be products recommended by the insulation manufacturer for the application indicated.

2.1.4 Jackets; ASTM C921, Type I (vapor barrier) for piping below ambient temperature, Type II (vapor permeable) for piping above ambient temperature. Type I may be used for all piping at Installer's option. Encase exterior pipe insulation with 24 gage aluminum jacket.

PART 3 - EXECUTION

3.1 General Installation of Piping System Insulation:

3.1.1 Install thermal insulation products in accordance with manufacturer's written instructions, and in compliance with recognized industry practices to ensure that insulation serves intended purpose. Install insulation materials with smooth and even surfaces and on clean and dry surfaces. Redo poorly fitted joints. Do not use mastic or joint sealer as filler for gapping joints and excessive voids resulting from poor workmanship. Do not apply insulation to surfaces while they are hot.

3.1.2 Maintain integrity of vapor-barrier on insulation and protect it to prevent puncture and other damage.

3.1.3 Do not install insulation until systems have been checked and found free of leaks. Surfaces shall be clean and dry before attempting to apply insulation. A professional insulator with adequate experience and ability shall install insulation.

3.1.4 Do not install insulation on pipe systems until acceptance tests have been completed except for flexible unicellular insulation. Do not install insulation until the building is "dried-in".

3.2 Installation of Fiberglass Piping Insulation:

3.2.1 Insulate the following piping systems:

1. Domestic hot water, 140°F or below; up to 1-1/2" pipe – 1" thick, 1-1/2" pipe and over – 1-1/2" thick.
2. Domestic cold water pipe; 1/2" thick.

3.2.2 Apply insulation to pipe with all side and end joints butted tightly. Seal longitudinal lap by pressurizing with plastic sealing tool. Apply 3 inch wide self sealing butt strips to joints between insulation sections. Insulate all fittings, flanges, valves and strainers with premolded insulation. Apply coat of insulating cement to fittings and wrap with glass cloth overlapping each wrap 1 inch and adjacent pipe 2 inches. Finish with heavy coat of general purpose mastic.

3.2.3 Use a continuous vapor retarder on all piping operating below ambient temperature such as domestic cold water piping.

3.2.4 Provide hanger or pipe support shields of 16 gauge (minimum) galvanized steel over the insulation which extends halfway up the pipe insulation cover and at least 6 inches on each side of the hanger.

3.2.5 Omit insulation on exposed plumbing fixture runouts from faces of wall or floor to fixture. Omit insulation on unions, flanges, strainer blowoffs, flexible connections and expansion joints.

3.3 Installation of Flexible Unicellular Pipe Insulation:

3.3.1 Insulate the following piping systems:

1. Exposed drains and water supplies for handicapped lavatories and sinks – 3/4" thick.

3.3.2 Apply insulation in accordance with the manufacturer's recommendations and instructions. Miter cut insulation to fit pipe fittings. Use approved cement to seal all joints and ends in the insulation.

3.3.3 Insulation outside the building shall be protected by a 0.016 inch thickness aluminum jacket with aluminum bands on 12 inch centers.

END OF SECTION 23 07 00

SECTION 26 01 00 – ELECTRICAL METHODS AND BASIC MATERIALS

I. GENERAL

1. SECTION INCLUDES:

   A. SUPPORTS

   B. EXCAVATION, TRENCHING, AND BACKFILLING

   C. CUTTING AND PATCHING

   D. EQUIPMENT CONNECTION

   E. IDENTIFICATION OF EQUIPMENT

   F. CLEANING AND PAINTING

II. PRODUCTS

1. SUPPORTS:

   A. FRAMING STEEL: Galvanized or painted rolled steel of standard shapes and sizes.

   B. MANUFACTURED CHANNEL: Hot dipped galvanized with all hardware required for mounting as manufactured by Unistrut, Steel City, or approved equal.

   C. MISCELLANEOUS HARDWARE: Standard sizes treated for corrosion resistance.

2. IDENTIFICATION:

   A. NAMEPLATES: Laminated black micarta with ¼" high engraved white letters.

   B. PANEL DIRECTORIES: Typewritten under plastic cover in metal circuit directory holder permanently fastened to door by manufacturer.

   C. WIRE AND CABLE MARKERS: Cloth, split sleeve, or tubing type.

III. EXECUTION

1. INSTALLATION

   A. Products shall be installed in accordance with manufacturer's instructions.

   B. Install support systems sized and fastened to accommodate weight of equipment and conduit, including wiring, which they carry.

      (1) Fasten hanger rods, conduit clamps, and outlet junction boxes to building structure using pre-cast insert system, expansion anchors, preset inserts, beam clamps, or spring steel clips.

      (2) Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry

walls; self-drilling anchors or expansion and anchors on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

(3) Do not fasten supports to piping, ceiling support wires, ductwork, mechanical equipment, or conduit.

(4) Do not use powder-actuated anchors.

(5) Do not drill structural steel members without written consent from the Architect.

(6) Fabricate supports from structural steel or steel channel.

(7) Install surface mounted cabinets and panel boards with minimum of four anchors.

(8) Provide steel channel supports to stand cabinets one inch off wall in wet locations.

(9) Bridge studs top and bottom with channels to support flush mounted cabinets and panel boards in stud walls.

C. Excavating, trenching, and backfilling shall be accomplished as indicated on the Drawings or where required to install systems and/or equipment.

(1) Trenches for all underground conduits or equipment shall be excavated to the required depths. Where soft, wet, or unstable soil is encountered, the bottom of the trench shall be filled with 6 inches of compacted gravel and sand fill. All trench bottoms shall be tamped hard. Trenches shall be shored as required to meet OSHA requirements and general safe working conditions.

(2) After conduits or equipment have been inspected and approved by the Architect and prior to backfilling, all forms shall be removed and the excavation shall be cleaned of all trash and debris. Material for backfilling shall consist of the excavation, or borrow of sand, gravel, or other materials approved by the Architect and shall be free of trash, lumber or other debris. Backfill shall be placed in horizontal layers, not exceeding 9 inches in depth and properly moistened to approximate optimum requirements. Each layer shall be compacted by hand, or machine tamped to a density equivalent to surrounding soil. Backfill shall be brought to suitable elevation above ground to provide for anticipated settlement and shrinkage. All paving broken up shall be repaired and returned to the original condition.

(3) All underground conduits shall have an underground (metal foil) tape installed 12 inches above conduit identified as ELECTRICAL to aid in future location of conduit.

(4) All underground conduits shall have an underground red tape installed 12” above conduit.

D. CUTTING AND PATCHING: This Contractor shall provide all cutting, digging, etc., incident to his work and shall make all required repairs thereafter to the satisfaction of the Architect, but in no case shall the Contractor cut into any major structural element, beam, or column without written approval of the Architect.

(1) Pavements, sidewalks, roads, curbs, walls, ceilings, floors, and roofs shall be sawcut, patched, repaired and/or replaced as required to permit the installation of the electrical work. Existing concrete floors and other slabs, which require

vertical piercing for installation of conduit raceways shall be neatly core drilled. The Contractor shall carefully lay out his drilling in advance and arrange it to minimize exposed work.

(2) The Contractor shall bear the expense of all cutting, patching, painting, repairing, or replacing of the work of other trades required because of his fault, error, or tardiness or because of any damage done by him.

(3) All patching, and finishing shall be performed by the General Contractor.

E. Make electrical connections to equipment in accordance with equipment manufacturer's instructions.

(1) Verify that wiring and outlet rough-in work is complete and that equipment is ready for electrical connection, wiring, and being energized.

(2) Make wiring connections in control panel or in wiring compartment of pre-wired equipment. Provide interconnecting wiring where indicated.

(3) Install and connect disconnect switches, controllers, control stations, and control devices as indicated.

(4) Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit in damp or wet locations.

(5) Install pre-fabricated cord set where connections with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.

(6) Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes.

F. Identify electrical distribution and control equipment, and loads served, to meet regulatory requirements and as specified herein.

(1) Degrease and clean surface to receive nameplates.

(2) Secure nameplates to equipment fronts using screws or rivets with edges parallel to equipment lines.

(3) Each new and existing panel shall have an external nameplate. Disconnect switches, starters or similar devices shall have a micarta engraved nameplate mechanically affixed with rivets indicating the load served and the location, such as "A/C 2" or "A/C 3 above ceiling". Letters shall be ¼" white on a black background. Panels shall be designated in this manner:

"Panel A
120/208 Volts
3 Phase 4 Wire
Served from Panel MP"

(4) Panel directories shall accurately indicate load served and location of load.

(5) Engrave plates as indicated on the Drawings.

G. Raceway junction boxes for each system shall be identified by painting the inside of the junction box cover for exposed work and both sides of the covers for concealed work according to the following code:

Receptacle Circuits	Black
120 V. Lighting Circuits	White
277 V. Lighting Circuits	Orange
208 or 240 V. Power & Misc.	Green
480 V. Power & Misc.	Brown
Fire Alarm System	Red
Intercom System	Yellow

If the established color code at this site conflicts with the above or other trades, the contractor shall so state in a letter outlining his proposed colors to maintain conformity

H. Install wire markers on each conductor in panel board gutters, boxes, and at load connections.

(1) Use distribution panel and branch circuit or feeder number to identify power and lighting circuits.

(2) Use control wire number as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings to identify control wiring.

I. Cleaning and Painting: The respective Contractors for the various phases of work shall clear away all debris, surplus materials, etc., resulting form their work or operations, leaving the job and equipment furnished in the clean first class condition.

(1) All fixtures and equipment shall be thoroughly cleaned of plaster, stickers, rust, stains and other foreign matter or discoloration, leaving every part in an acceptable condition ready for use.

(2) The Contractor shall refinish and restore to the original condition and appearance, all electrical equipment, which has sustained damage to manufacturer's prime and finish coats or enamel or paint. Materials and workmanship shall be equal to the requirements described for other painting.

END OF SECTION

SECTION: 26 02 00 - RACEWAY SYSTEMS

I. GENERAL

1. SECTION INCLUDES:

   A. CONDUIT AND CONDUIT FITTINGS

   B. ELECTRICAL BOXES AND FITTINGS

   C. WIREWAY

   D. SERVICE FITTINGS

II. PRODUCTS

1. CONDUIT AND FITTINGS:

   A. CONDUIT:

      (1) Metal conduit: Galvanized steel.

      (2) Metal tubing: Galvanized steel.

      (3) Flexible Conduit: Steel.

      (4) Liquid-tight Flexible Conduit: Flexible steel conduit with PVC jacket.

      (5) Plastic Conduit and Tubing: NEMA TC 2; PVC. Use Schedule 40 conduit.

   B. CONDUIT FITTINGS:

      (1) Conduit Fittings and Conduit Bodies: NEMA FB 1. Conduit fittings shall be steel threaded type.

      (2) Tubing Fittings: NEMA FB 1. Tubing fittings to be steel compression type for conduit up to 2” in diameter and set screw type for conduit 2-1/2” and larger.

      (3) Flexible Conduit Fittings: NEMA FB 1. Flexible conduit fittings to be steel set screw or screw-in type.

      (4) Liquid-tight Flexible Conduit Fittings: NEMA FB 1. Liquid-tight flexible conduit fittings shall be steel compression type.

      (5) Plastic Fittings and Conduit Bodies: NEMA TC 3.

2. ELECTRICAL BOXES:

   A. BOXES:

      (1) Sheet Metal: NEMA OS 1; galvanized steel 4” or 4-11/16” square. Provide galvanized plaster/tile ring for recessed outlet boxes.

      (2) Cast Metal: Aluminum or cast ferroalloy, deep type, gasketed cover, threaded hubs.

B. FLOOR BOXES for Installation in Cast-in-Place Concrete Floors: See electrical and telcom drawings for requirements.

C. LARGE ENCLOSURES: NEMA 250; Type 4, steel enclosures with manufacturer's standard enamel finish and cover, held closed screws.

D. LARGE CAST METAL BOXES:

(1) Surface-mounted Type: NEMA 250; Type 4 and Type 6, flat-flanged, surface mounted junction box; galvanized cast iron or cast aluminum box and cover with ground flange, neoprene gasket, and stainless steel cover screws.

(2) Underground Type: NEMA 250; Type 4 flanged, recessed cover box for flush mounting; galvanized cast iron box and plain cover with neoprene gasket and stainless steel cover screw.

3. WIREWAY:

A. ENCLOSURE: General purpose or raintight type with knockouts.

B. COVER: Screw type with full gasketing.

C. FITTINGS: Lay-in type with removable cover and drip shield for outdoor installation.

D. FINISH: Rust inhibiting primer coating with enamel finish.

4. SERVICE FITTINGS:

A. FLUSH FLOOR BOX COVERS:

(1) Cover material: Brass.

(2) Duplex Convenience Receptacle: Duplex flap opening hinged with holding screw.

(3) Communications: 2-1/8" X 1" combination threaded opening.

(4) Provide brass finish protective rings and carpet flanges.

III. EXECUTION

1. EXAMINATION AND PREPARATION:

A. Examine supporting surfaces to determine that surfaces are ready to receive work.

B. Electrical boxes shown on Drawings are approximate locations unless dimensioned. Obtain verification from Architect of floor box locations and locations of outlets prior to rough-in. Outlets may be relocated to a distance of ten feet prior to rough-in with no additional cost to the Owner.

2. INSTALLATION:

A. Use conduit and tubing for raceways in the following locations:

(1) Underground Installations: Rigid steel conduit, painted with two coats of epoxy asphaltic paint or schedule 40 PVC.

(2) Installations in Concrete: Rigid steel conduit or rigid non-metallic conduit (schedule 40).

(3) Exposed Outdoor Locations: Rigid steel conduit or IMC.

(4) Wet Interior Locations: Rigid steel conduit, IMC, or electrical metallic tubing. Use threaded or raintight fittings for conduit.

(5) Concealed Dry Interior Locations: Rigid steel conduit or electrical metallic tubing.

(6) Exposed Dry Interior Locations: Rigid steel conduit or electrical metallic tubing.

(7) MC type cable is prohibited.

B. Size raceways for conductor type installed.

(1) Minimum Size Conduit: ¾" in underground locations, ½" in all other locations.

(2) Maximum Size Conduit in Slab Above Grade: 1 – inch; do not route conduits larger than ¾" to cross each other.

C. Arrange conduit and tubing to maintain headroom and to present a neat mechanical appearance.

(1) Route exposed raceway parallel and perpendicular to walls and adjacent piping.

(2) Maintain minimum 6 inch clearance to piping and 12 inch clearance to heat surfaces such as flues, steam piping, and heating appliances.

(3) Maintain required fire, acoustic, and vapor barrier rating when penetrating walls, floors, and ceilings.

(4) Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack with pitch pocket.

(5) Group in parallel runs where practical. Use rack constructed of steel channel. Maintain spacing between raceways or de-rate circuit ampacities to NFPA 70 requirements.

(6) Use conduit hangers and clamps; do not fasten with wire or perforated pipe straps.

(7) Use conduit bodies to make sharp changes in direction.

(8) Terminate all conduits with insulated bushings.

(9) Use suitable caps to protect installed raceway against entrance of moisture and dirt.

(10) Provide a pull cord in all empty raceways.

(11) Install expansion joint fittings where raceway crosses building expansion joints.

(12) Install plastic conduit and tubing in strict accordance with the manufacturer's recommendations. When plastic conduit is installed, use galvanized rigid elbows for 90 degree bends.

D. Install electrical boxes as shown on the Drawings, and as required for splices, taps, wire pulling, equipment connections and regulatory requirements.

(1) Use cast outlet box in exterior locations, wet locations, and exposed interior locations

(2) Use large enclosure for interior pull and junction boxes larger than 12 inches in any dimension.

(3) Locate and install electrical boxes to allow access. Provide access panels if required.

(4) Locate and install electrical boxes to maintain headroom and to present a neat mechanical appearance.

(5) Install pull boxes and junction boxes above accessible ceilings or in unfinished areas.

(6) Provide knockout closure for unused openings.

(7) Align wall-mounted outlet boxes plumb and level for switches, and similar devices.

(8) Coordinate mounting heights and locations of outlets above counters and backsplashes

(9) Install lighting outlets to locate luminaries as shown on the Drawings.

E. Use recessed outlet boxes in finished areas where indicated.

(1) Secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness, and plaster/tile ring installation.

(2) Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.

(3) Locate boxes in masonry walls to require cutting corner only. Coordinate masonry cutting to achieve neat openings for boxes

(4) Do not install boxes back-to-back in walls; provide 6 inch separation, minimum. In acoustic-rated walls provide 24 inch separation minimum.

(5) Do not damage insulation.

F. Install wireway in accordance with manufacturer's instructions.

(1) Bolt wireway to wall using two-piece hangers or steel channels fastened to the wall or on a self-supporting structure. Install level.

(2) Mount raintight gutter in horizontal position only.

G. Install service fittings in accordance with manufacturer's instructions.

H. Interface outlet boxes, service fittings, floor boxes, etc. with connection of equipment.

I. The Contractor shall be responsible for providing and installing all conduit and raceway systems for all systems including but not limited to lighting, power, fire alarm system, intercom system, communications systems, mechanical systems, and HVAC control systems. Coordinate location, quantities, sizes and requirements with respective contractor for such systems.

END OF SECTION

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SECTION: 26 03 00 - WIRE, CABLE, AND DEVICES

I. GENERAL

1. RELATED DOCUMENTS:

   A. Section 26000 – Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

2. SECTION INCLUDES:

   A. WIRE AND CABLE

   B. WIRING DEVICES

II. PRODUCTS

1. WIRE AND CABLE:

   A. BUILDING WIRE:

      (1) Feeder and Branch Circuits 10 AWG and Smaller: Copper, solid conductor, 600 volt insulation, THHN/THWN.

      (2) Feeder and Branch Circuits 8 AWG and 6 AWG: Copper, stranded conductor, 600 volt insulation, THHN/THWN.

      (3) Feeder and Branch Circuit larger than 6 AWG: Copper, stranded, conductor, 600 volt insulation, THW.

      (4) Control Circuits: Copper, stranded conductor, 600 volt insulation, THHN/THWN.

   B. REMOTE CONTROL SIGNAL CABLE:

      (1) Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 60 degree C, individual conductors twisted together, shielded, and covered with PVC jacket.

      (2) Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 60 degree C, individual conductors twisted together, shielded, and covered with PVC jacket; UL listed.

   C. CORDS: Oil – resistant thermoset insulated multi – conductor flexible cord with identified equipment grounding conductor, suitable for extra hard usage in damp locations.

2. WIRING DEVICES AND WALLPLATES:

   A. MANUFACTURERS:

      (1) Hubbell.

      (2) Legrand.

B. WALL SWITCHES: AC general use, quiet – operating snap switch rated 20 amperes and 120/277 volts AC, with plastic toggle handle.

(1) Single Pole Switch: Hubbell 1221

(2) Double Pole Switch: Hubbell 1222

(3) Three Way Switch: Hubbell 1223

(4) Four Way Switch : Hubbell 1224

(5) Pilot Light Type: Lighted handle, Model 1221-PL manufactured by Hubbell.

(6) Color: To be selected by Architect from standard colors.

C. RECEPTACLE:

(1) Convenience Receptacle Configuration: Type 5-20R, plastic face. Model 5362 manufactured by Hubbell.

(2) Specific Purpose Receptacle: Configuration indicated on Drawings with black plastic face.

(3) Provide straight-blade receptacles to NEMA WD 1.

(4) Provide locking-blade receptacles to NEMA WD 5.

(5) GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. Model GF-5362 manufactured by Hubbell.

(6) Color: To be selected by Architect from standard colors.

D. WALL DIMMER: Rotary dial type, color to be selected by Architect. Model C-2000 manufactured by Lutron. Rating of 2000 watts. Verify voltage.

E. WEATHERPROOF COVER PLATE: Gasketed cast metal with hinged gasketed device covers rated raintight while in use in accordance with Article 410-57 of the National Electrical Code.

F. ATTACHMENT PLUG CAP: Match receptacle configuration provided for equipment connection.

G. CLOCKS: Battery operated Quartz clocks shall be provided as noted on the drawings. Clocks shall have a 12” dial, black gothic numerals and red sweep second hand. Clock shall operate on one or two AA batteries. The initial batteries shall be lead calcium.

III. EXECUTION:

1. EXAMINATION AND PREPERATION:

A. Verify that interior of building has been physically protected from weather.

B. Verify that mechanical work which is likely to injure conductors has been completed.

C. Completely and thoroughly swab raceway system before installing conductors.

2. INSTALLATION:

A. WIRING METHODS:

(1) Concealed Interior Locations: Building wire in raceway.

(2) Exposed Interior Locations: Building wire in raceway.

(3) Above Accessible Ceilings: Building wire in raceway.

(4) Wet or Damp Interior Locations: Building wire in raceway.

(5) Exterior Locations: Building wire in raceway.

(6) Underground Locations: Building wire in raceway.

B. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.

(1) Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 100 feet; and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet.

C. Neatly train and secure wiring inside boxes, equipment and panelboards.

D. Use UL listed wire pulling lubricant for pulling conductors in raceways.

E. Protect exposed cables.

F. Support cables above accessible ceilings to keep them from resting on ceiling tiles.

G. Make splices, taps, and terminations to carry full ampacity of conductors without perceptible temperature rise.

H. Terminate spare conductors with electrical tape.

I. Devices shall mount flush or as indicated on the Drawings.

J. Install wiring devices in accordance with manufacturer’s instructions.

(1) Install wall switches 48 inches above floor, “OFF” position down.

(2) Install wall dimmers 48 inches above floor. De-rate ganged dimmers as instructed by manufacturer. Do not use a common neutral, provide a separate neutral for each dimmed circuit.

(3) Install convenience receptacles 18 inches above floor, 6 inches above counters or splashbacks, with grounding pole on bottom. Verify typical mounting heights with Engineer prior to construction and field coordinate with telcom outlets. Advise the Engineer of any conflicts prior to rough-in.

(4) Install GFCI receptacles at all outdoor locations and all indoor locations as required by NFPA70, and as indicated.

(5) Install specific purpose receptacles at heights shown on Drawings.

K. Install wall plates flush and level.

(1) Install decorative plates on switch, receptacle, telephone, television and blank outlets in finished areas.

(2) Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

(3) Install weatherproof coverplates on all devices/boxes in wet or outdoor locations.

3. FIELD QUALITY CONTROL:

A. Perform field inspection and testing of circuits under provisions of Section 16000.

(1) Inspect wire and cables for physical damage and proper connection.

(2) Torque test conductor connections and terminations to manufacturer's recommended values.

(3) Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

END OF SECTION

SECTION: 26 05 00 - LIGHTING

I. GENERAL

1. RELATED DOCUMENTS:

   A. Section 26000 – Electrical General Requirements, apply to the work specified in this Section, with additions and modifications specified herein.

2. SECTION INCLUDES:

   A. LUMINAIRES

   B. SHIELDING MEDIA

   C. LAMPS

   D. BALLASTS

   E. EXIT SIGNS

   F. EMERGENCY LIGHTING UNITS

   G. PHOTOCELLS

   H. TIME SWITCHES

   I. LIGHTING CONTACTORS

   J. LED BOARDS

   K. LED DRIVERS

II. PRODUCTS

1. LUMINAIRES:

   A. LUMINAIRE SCHEDULE:

      (1) Product requirements for each luminare are specified in luminare schedule on Drawings.

   B. ACCESSORIES: Provide required accessories for mounting and operation of each luminare as indicated.

      (1) Recessed Luminaires: Provide trim type suitable for ceiling system in which luminare is installed.

      (2) Thermal Protection: Provide thermal protection devices to meet NFPA 70 requirements.

      (3) Surface Luminaires: Provide spacers and brackets required for mounting.

C. LAY-IN TROFFERS:

(1) Door Frame: Aluminum .050", extruded with mitered corners. Latches to be fully enclosed, spring loaded, cam type. Door frame shall be fully gasketed.

(2) Housing: Cold rolled steel, 22 gauge minimum with smooth effect mitered corners.

(3) Finish: Painted after fabrication with 90% reflective glossy white thermosetting powder coat.

2. SHIELDING MEDIA:

A. PRISMATIC LENS FOR FLUORESCENT TROFFERS:

(1) Material: Clear virgin acrylic.

(2) Type: Prismatic cones, pattern 12 straight flat prisms.

(3) Thickness: .156" minimum.

B. PRISMATIC LENS FOR FLUORESCENT WRAP AROUND FIXTURES:

(1) Material: Clear virgin acrylic.

(2) Type: Sides-linear prisms, bottom-pyramidal prisms.

(3) Hinging: Either side.

3. LAMPS:

A. DESCRIPTION:

(1) Incandescent Lamps: 130 volts, inside frosted, shape as scheduled. Halogen lamps frosted or clear as scheduled.

(2) Fluorescent Lamps: Size and wattage as scheduled, 4100°K temperature and CRI $\geq$ 75.

(3) High Pressure Sodium HID Lamps: Clear or coated per luminare manufacturer's recommendation. Suitable for ballast furnished in luminare for all burning positions.

(4) Reflector Lamp Beam Patterns: Conform to ANSI C78.379.

4. BALLASTS:

A. FLUORESCENT BALLASTS: Provide electronic fluorescent ballasts suitable for use under installation conditions listed for each luminare.

(1) Ballasts shall meet the requirements of the General Communications Commission Rule and Regulations, Part 18, Class A.

(2) Ballasts shall not contain Polychlorinated Biphenyls (PCB's).

(3) Ballasts shall have a power factor of 95% minimum.

(4) Ballasts shall be UL listed, Class P, and sound rated “A”.

(5) Ballasts shall have a frequency of operation of 20 kHz or greater, and operate without visible flicker.

(6) Where applicable, ballasts shall meet minimum efficiency standards of Public Law No. 100-357, National Appliance Energy Conservation Amendments of 1988.

(7) Ballasts case temperature shall not exceed 25°C temperature rise over 40°C ambient. Ballasts cast temperature must not exceed 85°C.

(8) Ballasts shall withstand line transient as defined in ANSI/IEEE C 62.41, Category A.

(9) Input third harmonic current content shall not exceed 10%.

(10) Ballasts shall be manufactured by Advance, Magnetek, or Motorola.

B. COMPACT FLUORESCENT BALLASTS: Provide solid state electronic ballasts suitable for use under installation conditions listed for each luminare.

(1) Ballasts shall be high power factor.

(2) Ballasts shall meet the requirements of the General Communications Commission Rule and Regulations, Part 18, Class A.

(3) Ballasts shall be UL listed, Class P, and sound rated “A”.

(4) Ballasts shall have a frequency of operation of 20 kHz or greater, and operate without visible flicker.

(5) Where applicable, ballasts shall meet minimum efficiency standards of Public Law No. 100-357, National Appliance Energy Conservation Amendments of 1988.

(6) Ballasts case temperature shall not exceed 25°C temperature rise over 40°C ambient. Ballasts cast temperature must not exceed 85°C.

(7) Ballasts shall withstand line transient as defined in ANSI/IEEE C 62.41, Category A.

(8) Input third harmonic current content shall not exceed 10%.

C. HID BALLASTS: Provide HID ballast suitable for use under installation conditions and type of each luminare.

(1) Voltage: As scheduled.

(2) Power Factor: High power factor.

(3) Description: ANSI C82.4.

(4) Integral Equipment: Ballast to be mounted internally of the luminare.

5. EXIT SIGNS:

A. DESCRIPTION: Exit sign fixture.

(1) Lamps: Manufacturer’s standard.

(2) Voltage: 120/277 volt as scheduled.

B. CONSTRUCTION:

(1) Face: Stencil face with red letters.

(2) Directional Arrows: Universal for field adjustment.

(3) Mounting: Universal for field selection.

(4) Exterior: Shall have a mechanical connection (bolts and screws) between the fixture housing and the canopy base.

C. EMERGENCY POWER SUPPLY: Integral, listed for emergency lighting use.

(1) Battery: Lead calcium or nickel cadmium type.

(2) Battery Charger: Dual-rate type.

(3) Indicators and Controls: AC ON; test switch.

D. WARRANTY: 5-year full fixture.

6. EMERGENCY LIGHTING UNITS:

A. DESCRIPTION: Provide emergency battery units in fixtures as indicated on drawings. All emergency battery units shall be rated for a minimum output of 1400 lumens.

(1) Input Voltage: 120/277 volts as scheduled.

(2) Battery: Lead calcium type.

(3) Battery Charger: Dual-rate type.

B. INDICATORS AND CONTROLS: AC ON; recharging, test switch.

C. ELECTRICAL CONNECTION: Conduit connection.

D. WARRANTY: 5-year full fixture.

7. PHOTOCELL SWITCH:

A. MANUFACTURERS:

(1) Precision

(2) Tork

(3) Paragon

B. DESCRIPTION: Photocell switch manufactured to NEMA ICS 2.

C. RATINGS:

(1) Contact Ratings: 1800 VA at 120/277 volts.

(2) Sensitivity: Field adjustable from 3 to 10 foot-candles.

D. ENCLOSURE: Gasketed, cast aluminum or feralloy box with conduit hub.

8. TIME SWITCH:

A. MANUFACTURERS:

(1) Precision

(2) Tork

(3) Paragon

B. DESCRIPTION: Clock timer manufactured to NEMA ICS 2, with astronomical dial, 12-hour spring wound carry over, and day skipping feature.

C. RATINGS:

(1) Contact Ratings: 20 ampere per pole, number of poles as indicated on Drawings.

(2) Coil Voltage: 120 volts, 60 Hz.

(3) Dial Timer: Seven (7) day.

(4) Enclosure: NEMA 1 or 3R as required.

9. CONTACTORS:

A. MANUFACTUERS:

(1) Square “D” Company

(2) Cutler-Hammer

(3) General Electric Company

B. LIGHTING CONTACTORS: NEMA ICS 2; mechanical held, electrically operated.

(1) Coil Operating Voltage: 120 volts, 60 Hz.

(2) Enclosures: NEMA ICS 6; Type 1, general purpose.

(3) Multi-pole, 20 amp rating, number of poles as indicated on the Drawings.

10. LED LIGHTING FIXTURES:

A. DESCRIPTION: Self-contained emergency lighting unit.

(1) Input Voltage: 120/277 volts as scheduled.

(2) LED Lamp Life: Minimum 100,000 hours

(3) Battery Charger: Dual-rate type.

(4) Lamps: Sealed beam PAR, DC type or halogen.

B. SPARES: For each type of LED lighting fixture provide additional complete spare lighting fixtures equal to 5% of total quantity installed and 10% spare components (LED boards and drivers) of total quantity installed.

C. ELECTRICAL CONNECTION: Conduit connection.

D. WARRANTY: Minimum 5-year full fixture.

III. EXECUTION

1. EXAMINATION AND PREPARATION: Examine adjacent surfaces to determine that surfaces are ready to receive work.

2. INSTALLATION:

A. Install luminaires and accessories in accordance with manufacturer's instructions.

(1) Provide pendant accessory to mount suspended luminaires at height indicated. Use swivel hangers on sloped ceilings.

(2) Support surface mounted luminaires from ceiling structure; provide auxiliary support across ceiling structure support. Fasten to prohibit movement.

(3) Install recessed luminaires to permit removal from below. Install luminaires so that there is no light leakage around fixture trim. Support fixtures in accordance with Article 410-16 C of the National Electrical Code.

(4) Install lamps in luminaires and lampholders.

3. ADJUSTING AND CLEANING:

A. Align luminaires and clean lenses and diffusers at completion of work.

B. Aim adjustable luminaires and lampholders as indicated or as directed.

C. Adjust directional arrows on exit signs to meet approval of authority having jurisdiction.

D. Clean paint splatters, dirt and debris from installed luminaires.

E. Relamp luminaires which have failed lamps at completion of work.

F. Touch up luminaire and pole finish at completion of work.

G. Adjust relays, timers, photo controls, etc. to achieve specified or directed operation.

END OF SECTION