Alaska State Troopers
Dispatch Relocation
Fairbanks, Alaska

Final Documents

For:
State of Alaska Dept. of Public Safety
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Anchorage, Alaska 99705

October 10, 2017

Design Alaska

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- **Specifications**

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PART 1 GENERAL

1.1 SCOPE: SECTION 02 41 19 - SELECTIVE DEMOLITION

A. This Section covers 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. Demolition and removal of selected portions of building or structure.

2. Demolition and removal of selected site elements.

3. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

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

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's tenants on-site operations are uninterrupted.

2. Interruption of utility services. Indicate how long utility services will be interrupted.

3. Coordination for shutoff, capping, and continuation of utility services.

4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces that might be misconstrued as damage caused by demolition operations. Comply with Division 1 Section 01 32 33 "Photographic Documentation." Submit before Work begins.

D. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

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

1.7 FIELD 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.

1. Before selective demolition, Owner will remove the following items:

a. Furnishing and Equipment.

C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials are present, see specification 02 80 00 Hazardous Materials.

E. 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.

1.8 COORDINATION

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

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

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

PART 3 EXECUTION

3.1 EXAMINATION

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

B. Perform an engineering survey of 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 building demolition operations.

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

C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Comply with requirements specified in Division 1 Section 01 32 33 "Photographic Documentation."

2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Arrange to shut off utilities with utility companies.

2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.

c. Equipment to Be Removed: Disconnect and cap services and remove equipment.

d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.

3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1 Section 01 50 00 "Temporary Facilities and Controls."

B. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

5. Maintain fire watch during and for at least 4 hours after flame-cutting operations.

6. Maintain adequate ventilation when using cutting torches.

7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

10. Dispose of demolished items and materials promptly. Comply with requirements in Division 1 Section 01 74 19 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.

2. Pack or crate items after cleaning and repairing. Identify contents of containers.

3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

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

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Earth Berm: Remove earth berm dirt from perimeter of building per construction documents. Dirt to remain on DOT property in location identified by owner.

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

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.

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

3. Comply with requirements specified in Division 1 Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

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

PART 1 GENERAL

1.1 DESCRIPTION

A. As-built documents provided by owner identify hazardous materials are present on jobsite. The types of Hazardous Materials identified, and which impact this project, are listed below. Testing to verify presence of Asbestos has not been performed.

1. Non-Friable Cement Asbestos Board is located at the exterior wall beneath the existing berm. Estimated amounts of material to be removed is 331 square feet. Contractor to verify amounts. See drawing A402 for exact locations.

B. Work shall meet or exceed the minimum requirements of all applicable Federal, State and local regulations, statutes and administrative codes. The Contractor shall be responsible for compliance with the most recent revisions to the regulations throughout the duration of work on the project. In instances where conflicts occur between regulations or between regulation and the contract specifications, the most stringent shall apply, unless otherwise approved by the Owner's Representative.

C. Operation inspections may be required by Federal, State, or local regulatory agencies. The Contractor must comply with all such inspection requirements, and notify the Owner as soon as possible of any inspections.

1.2 REFERENCES

A. The publications are referred to in this Specification by basic designation only.

B. Federal:

1.	29 CFR Part 1910	Occupational Safety and Health Standards - General Industry.
2.	29 CFR Part 1926	Occupational Safety and Health Standards for Construction.
3.	40 CFR Part 31	EPA Asbestos NESHAPS

C. Alaska Department of Labor:

1.	8 AAC 61	Alaska Occupational Safety and Health.
2.	ANSI 78 (1992)	Practices for Respiratory Protection.
3.	ANSI Z87.1 (1989; Z87.1a-1991 Supplement)	Occupational & Educational Eye & Face Protection.

D. American Society for Testing and Materials:

1.	ASTM D1331	Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface-Active Agents.
2.	ASTM D4397	Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
3.	ASTM E1368-03	Standard Practice for Visual Inspection of Asbestos Abatement Projects.

1.3 PROTECTION OF EXISTING WORK TO REMAIN

A. Perform Hazardous Material removal work in the project work areas without damage or contamination of adjacent work. Where existing work is damaged or contaminated, it shall be restored to its original condition at no expense to the Owner. The restorative procedures shall be approved by the Owner's Representative prior to start of restoration.

1.4 PERMITS, LICENSES, AND NOTIFICATIONS

A. The Hazardous Materials contractor shall secure necessary permits and shall provide timely notification of such actions as may be required by federal, state, and local authorities.

1.5 HAZARDOUS MATERIALS WORK PLAN SUBMITTAL

A. The Contractor shall submit for Owner approval five copies of the submittal materials specified below, at least 5 days prior to start of work at the site or 21 days after Notice to precede, whichever is sooner. The Owner's Representative will review the plan, and provide any review comments and identify any items considered to be in conflict with, or a change to, the contract. No Hazardous Material work at the site, with the exception of site inspections and mobilization, shall be performed until the Hazardous Materials work plan submittal is approved by the Owner's Representative. The Contractor shall allow 15 days in the schedule for the Owner's review and approval. No adjustment will be made for resubmittals required as a result of noncompliance. To facilitate review, the submittal shall be separated into sections containing the following information:

1. Asbestos Removal and Disposal Schedules: The Contractor shall submit a schedule indicating the complete sequence of asbestos removal activities planned for each work site.

2. Disposal Site Designations: The Contractor shall use any approved asbestos landfill for disposal of asbestos waste. The Contractor is responsible for all disposal arrangements and costs. The Contractor shall submit the name and location of disposal site intended for materials from each of the work sites.

3. Waste Transporter Designation: The Contractor shall submit the name, address, and qualifications of the waste transporter(s).

4. Notifications, Certificates, and Approvals:

   a. The Contractor shall submit a copy of the written "Notification of Demolition and Renovation" notifying the Environmental Protection Agency (EPA) of its intent to remove and dispose of asbestos from each location where the quantity of work herein specified requires such a filing with the EPA.

   b. The Contractor shall submit a copy of the written notification to the State of Alaska Department of Labor (ADOL).

   c. The Contractor shall submit a copy of the letter from the ADOL stating that the proposed workers are certified for asbestos work.

   d. The Contractor shall submit legible copies of its workers' current State of Alaska Asbestos Abatement Certificates.

   e. The Contractor shall ensure the Project Manger receives copies of all notifications, certificates and approvals.

5. Work Plan shall include:

   a. Type and amounts of asbestos to be removed.

   b. Method of removal and products to be used.

   c. Method of containment including signage, critical barriers, air monitoring etc.

   d. Equipment proposed for abatement activities.

   e. Clearance testing method—NVLAP certified testing laboratory (certification included).

1.6 FINAL SUBMITTAL

A. The Contractor shall submit the following documents with the application for final payment. Final payment shall not be authorized if this submittal is not complete.

1. Waste Shipment Records (40 CFR 61, Figure 4).

2. Disposal Site Receipts.

3. Revised EPA Notification showing actual disposal amounts.

4. When abatement is complete submit drawings annotated sufficiently to show extent of actual abatement work performed. These drawings will be a separate submittal from the as-built drawings.

PART 2 PRODUCTS

2.1 GENERAL

A. The Contractor shall provide standard commercial quality for all other materials that may be required to complete the work. All materials shall be designed, manufactured, and intended for the use required for the Work.

PART 3 EXECUTION

3.1 PREPARATION

A. The Contractor shall notify and coordinate all day-to-day hazardous materials abatement activities with all other trades and the Owner’s Representative.

B. Communicate with building occupants through signage of abatement activities at all exits and entrances into work area.

C. Decontamination Area: Contractor to provide for separate fire exiting per code.

D. Coordinate all required utility shutdowns and disconnects with the Project Manager. Notify the Owner's Representative in writing a minimum of 48 hours in advance of any required shutdown. Include a description of the affected utility, the extent of the shutdown, the affected areas, and any operations that will be impacted by the shutdown. Verify that utilities have been disconnected.

E. Prior to commencement of any Work activity effecting Hazardous Materials, the Competent Person (CP) shall inspect the site and identify and evaluate the safety and health hazards that may be encountered in the surroundings and working conditions, and the appropriate work practices, controls and personal protective equipment necessary for worker protection and occupant safety. The CP shall review the results of the inspection with workers assigned to the Work tasks and may make informal alterations to the Contractor’s work plan as necessary to address specific site hazards. The CP shall be present on site during all Hazardous Material activities to monitor workplace safety.

3.2 WORK AREAS

A. Contractor must maintain Owner/User accessibility to areas not under renovation during the period of this project.

B. The Contractor must establish and control access to Work Areas in accordance with the Contractor's original Hazardous Materials work plan, and with the OSHA/ADOL Construction Standard for Asbestos and Lead (29 CFR 1926).

C. Provide barriers to prevent building users from entering the work area except under emergency conditions.

D. Provide negative containment enclosure and mechanical ventilation for the area in which abatement is performed.

E. Provide decontamination vestibule for worker and occupant protection.

3.3 PROTECTION PROCEDURES

A. The Contractor shall use engineering controls, work practices, and personal protective equipment in accordance with their workplan, the Contractor's continuing hazard assessment, and in conformance with the OSHA/ADOL requirements for the applicable classes of Hazardous Materials work. Controls shall be sufficient to maintain worker exposures to air contaminants below published OSHA Permissible Exposure Limits (29 CFR 1910, Subpart Z) and prevent migration of Hazardous Materials outside the Work Area that may affect occupant safety.

B. Protection of Existing Property: Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Owner. Any damaged items shall be repaired or replaced as approved by the Owner's Representative. The Contractor shall coordinate the work of this section with all other work.

C. Provide and maintain suitable barricades, shelters, lights, and danger signals during the progress of the work. These shall meet the requirements of the State and/or local building codes. The Contractor shall be responsible for all barriers until completion of contract. The Contractor shall be responsible for removing all barriers, danger signals, shelters, lights, etc. from the job site at the completion of the work.

3.4 REMOVAL PROCEDURES

A. All ACM removal shall be in accordance with the Contractor's general Hazardous Materials work plan, applicable regulations, and this specification.

B. The Contractor shall provide continuous on-site supervision by his/her approved Competent Person.

C. The amount of dust resulting from abatement activities shall be controlled by wet methods or HEPA vacuuming to prevent the spread of dust and to avoid creation of a nuisance in the surrounding areas. The Owner or his approved Representative shall be notified 24 hours in advance of any asbestos disturbance taking place outside of a negative pressure enclosure.

3.5 SITE OBSERVATION

A. The Owner's Representative and state or federal agencies may make unannounced visits to the site during asbestos work.

1. If the Owner's Representative or agency visitor determines that practices are in violation of applicable regulations, or are endangering workers or the facility, they will immediately notify the Contractor orally that operations must cease until corrective action is taken. Such notification will be followed by written confirmation.

2. After receiving such notification to stop work, the work may not be restarted until the Contractor receives written authorization from the Owner’s Representative.

3. Any costs resulting from such a stop work order under this specification will be borne by the Contractor and will not be a basis for an increase in the contract amount or an extension of time.

3.6 ABATEMENT AIR MONITORING

A. Provide air monitoring during all abatement activities for outside the work area and within the work. Employee exposure shall not exceed 30 micrograms per cubic meter within an 8 hour period.

3.7 DISPOSITION OF MATERIALS - GENERAL

A. Remove all materials or debris resulting from demolition operations from the containment area and site. Removed items and shall become the property of the Contractor and shall be disposed of in a legal manner, complying with all Local, State and Federal laws and regulations. The Contractor shall provide receipts indicating the final disposition of all materials.

1. Disposal receipts for all Hazardous Material debris including quantities.

2. Non-hazardous wastes shall be disposed of in an approved off-site disposal area at the Contractor’s expense.

B. The Contractor is required to pay all costs and dispose of all materials scheduled for demolition or removal off-site at a disposal facility permitted to accept the respective material.

C. Transportation of all debris to disposal site must be in covered vehicles.

3.8 ASBESTOS ABATEMENT WASTE DISPOSAL

A. Asbestos Contaminated Water: All asbestos contaminated water must be filtered with appropriate filters prior to disposal in the sanitary sewer.

B. Asbestos wastes shall be disposed of in any Approved Asbestos Landfill.

C. The Contractor shall determine current waste handling, storage, transportation, and disposal requirements for the waste disposal facility. He must comply fully with these requirements and all U. S. Department of Transportation and EPA regulations.

D. All ACM adhesive or mastic removal chemicals will be properly containerized and disposed of as hazardous waste.

3.9 CLEANING OF WORK AREA

A. Upon completion of asbestos removal work in the control area, remove visible accumulations of material and debris. Wet clean or HEPA vacuum all surfaces within the control area.

B. Ensure that all Hazardous Materials have been encapsulated or removed, and that the area is free of dust and debris.

C. The Contractor will notify the Owner's Representative when the abatement work and cleaning have been completed and will request a visual inspection. The Contractor’s Competent Person shall schedule an inspection with the Owner’ to verify the completion status. During this inspection, the Competent Person will review the physical condition and appearance of the work sites.

D. Final clearance air monitoring tests will not be performed until all areas and materials within the control area are fully clean and dry.

E. If the clearance air monitoring results meet the clearance testing criteria for the work, then the HEPA filtration units may be deactivated and all seals, barriers, barricades, and decontamination areas shall be dismantled and removed.

3.10 ASBESTOS CLEARANCE TESTING

A. The Contractor's Air Monitoring Firm shall inspect each work area when notified by the Contractor that asbestos removal has been substantially completed and the work area is ready for final inspection. The inspection shall be performed in accordance with ASTM E1368-03.

B. If the inspection indicates that the removal work has failed to meet the specified requirements, the Air Monitoring Firm will issue a written notice to the Owner's Representative and the Contractor informing them of the deficiencies. The Contractor shall correct all deficiencies and request a reinspection.

C. The Air Monitoring Firm shall conduct clearance air monitoring in accordance with NIOSH Method 7400. This air monitoring will not be performed until all surfaces in the work area are clean and dry.

D. The clearance levels of airborne fibers for each of the five samples from each of the areas to be cleared must be less than or equal to 0.01 fibers per cubic centimeter [0.01 f/cm3] of air before the work is accepted and before the work area is released to other trades.

E. If the clearance test results do not meet the clearance criteria, the Contractor shall reclean the work area and request a reinspection by the Air Monitoring Firm. The Air Monitoring Firm shall repeat the clearance air monitoring tests as soon as the work area is satisfactorily clean and dry. All associated costs, including delay and standby time required for repeat cleaning and clearance monitoring shall be at the Contractor's expense. Additional monitoring evaluation costs resulting from failure to meet clearance requirements shall be at the Contractor's expense.

F. The Contractor has the option, at its expense and at no cost to the Owner, of having failed PCM sample media sent to NVLAP accredited laboratory for TEM analysis.

G. If all air monitoring results have indicated that airborne fiber counts meet the requirements for clearance testing of the work, all seals, plastic, debris, and decontamination areas shall be removed and disposed of as ACM contaminated waste.

H. Once the work area barriers, including plastic sheeting, decontamination area, HEPA filtration units, etc., have been removed, the Air Monitoring Firm shall conduct an additional visual inspection to verify that there was no asbestos debris, contaminated water, or other residue concealed by the work area protection installations. All such residue shall be cleaned up using HEPA vacuum cleaners and wet wiping methods.

3.11 SUBSTANTIAL COMPLETION OF ABATEMENT ACTIVITIES

A. Once the Hazardous Materials control area barriers, including plastic sheeting, decontamination area, HEPA filtration units, etc., have been removed, the Contractor shall conduct an additional visual inspection to verify that no asbestos debris, contaminated water, or other residue were concealed by the control area protection installations. All such residue shall be cleaned up using HEPA vacuum cleaners and wet wiping methods.

3.12 FINAL COMPLETION

A. At the end of project, Contractor to provide certification that all asbestos required to be removed in the contract documents has been removed AND that no products containing asbestos were installed in the renovation work.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 07 13 00 - SHEET WATERPROOFING

A. This section includes the following:

1. Sheet Waterproofing:

a. Self-adhered modified bituminous sheet membrane.

1.2 RELATED REQUIREMENTS

A. Section: Concrete substrate.

1.3 REFERENCE STANDARDS

A. ASTM D412.

B. ASTM D1876.

C. ASTM D5295/D5295M.

D. ASTM D5385/D5385M.

E. ASTM E96/E96M.

F. NRCA (WM).

1.4 SUBMITTALS

A. Product Data: Provide data for membrane.

PART 2 PRODUCTS

2.1 WATERPROOFING APPLICATIONS

A. Self-Adhered Modified Bituminous Sheet Membrane:

1. Location: Per drawings.

2. Cover with rigid insulation.

2.2 MEMBRANE MATERIALS

A. Self-Adhered Modified Bituminous Sheet Membrane:

1. Thickness: 60 mil (0.060 inch).

2. Sheet Width: 36 inches.

3. Tensile Strength:

a. Membrane: 325 pounds per square inch, minimum, measured according to ASTM D412 Method A, using die C and at spindle-separation rate of two inches per minute.

4. Water Vapor Permeance: 0.05 perm, maximum, measured in accordance with ASTM E96/E96M.

5. Lap Adhesion Strength: 5 pounds per inch, minimum, when tested according to ASTM D1876.

6. Hydrostatic Resistance: Resists the weight of 200 feet when tested according to ASTM D5385/D5385M.

7. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.

8. Manufacturers:

a. GCP Applied Technologies: www.gcpat.com.

b. Or equal.

2.3 ACCESSORIES

A. Sealant for Cracks and Joints in Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

3.2 PREPARATION

A. Protect adjacent surfaces from damage not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.

E. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

F. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.

1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.

2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in the reference standard.

3. Remove and replace areas of defective concrete as specified in Section.

4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.

5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

3.3 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.

B. Roll out membrane, and minimize wrinkles and bubbles.

C. Overlap edges and ends, minimum three inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.

D. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

E. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.

F. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.

G. Seal membrane and flashings to adjoining surfaces.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 07 21 00 - THERMAL INSULATION

A. This section includes the following:

1. Board insulation at perimeter foundation wall and exterior wall behind metal siding wall finish.

1.2 REFERENCE STANDARDS

A. ASTM C578.

B. ASTM C665.

C. ASTM E84.

D. ASTM E136.

1.3 SUBMITTALS

A. Product Data: Provide data on product characteristics and performance criteria.

1.4 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 APPLICATIONS

A. Insulation at Perimeter of Foundation: Expanded polystyrene board.

2.2 FOAM BOARD INSULATION MATERIALS

A. Expanded Polystyrene (EPS) Board Insulation: ASTM C578, Type XI; with the following characteristics:

1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.

2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.

3. Board Size: 48 by 96 inch.

4. Board Thickness: Per drawings inches.

5. Board Edges: Square.

6. Thermal Resistance: of 3.1 per at mean temperature.

7. Manufacturers:

a. Insulfoam LLC: www.insulfoam.com/#sle.

b. Or equal.

2.3 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.

1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.

2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.

4. Formaldehyde Content: Zero.

5. Thermal Resistance: R-value of 4.17 per inch at 50 degrees F.

6. Manufacturers:

a. CertainTeed Corporation: www.certainteed.com.

b. Johns Manville: www.jm.com.

c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.

d. Or equal.

2.4 ACCESSORIES

A. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install boards horizontally on walls.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.3 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install in exterior wall spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.4 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 07 42 13 - METAL WALL PANELS

A. This section includes the following:

1. Manufactured metal panels for walls, with accessory components.

1.2 REFERENCE STANDARDS

A. ASTM A653/A653M.

1.3 SUBMITTALS

A. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.6 WARRANTY

A. Correct defective work within a five year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Metal Wall Panels - Concealed Fasteners: Asbuilt drawings indicate panel as Walcon - R70S metal wall panels.

1. Basis of design; Prestige Series 2+10 by AEP Span. Contractor to field verify.

2. Or equal.

2.2 MANUFACTURED METAL PANELS

A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.

1. Provide exterior panels.

2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.

3. Design Pressure: In accordance with applicable codes.

4. Maximum Allowable Deflection of Panel: L/180 for length (L) of span.

5. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.

6. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

7. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.

8. Corners: Factory-fabricated in one continuous piece with minimum two-inch returns.

B. Exterior Panels:

1. Profile: Vertical; style as indicated.

2. Side Seams: Double-interlocked, tight-fitting, sealed with continuous gaskets.

3. Material: Precoated steel sheet, 24 gage.

4. Panel Width: Match existing.

5. Color: To match existing.

C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; brake formed to required angles.

D. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

E. Anchors: Galvanized steel.

2.3 MATERIALS

A. Precoated Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) or Forming Steel (FS), with G90/Z275 coating; continuous coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

2.4 FINISHES

A. Exposed Surface Finish: Panel manufacturer's standard polyvinylidene fluoride (PVDF) coating, top coat over epoxy primer.

2.5 ACCESSORIES

A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.

B. Concealed Sealants: Non-curing butyl sealant or tape sealant.

C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.

D. Field Touch-up Paint: As recommended by panel manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install panels on walls in accordance with manufacturer's instructions.

B. Fasten panels to structural supports; aligned, level, and plumb.

C. Locate joints over supports.

D. Use concealed fasteners unless otherwise approved by.

3.2 CLEANING

A. Remove site cuttings from finish surfaces.

B. Remove protective material from wall panel surfaces.

C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 07 62 00 - SHEET METAL FLASHING AND TRIM

A. This section includes the following:

1. Fabricated sheet metal items, including flashings and counterflashings.

2. Sealants for joints within sheet metal fabrications.

3. Precast concrete splash pads.

1.2 REFERENCE STANDARDS

A. AAMA 2605.

B. ASTM A653/A653M.

C. ASTM C920.

D. CDA A4050.

E. SMACNA (ASMM).

1.3 SUBMITTALS

A. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.

1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.

2.2 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2-inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.

2.3 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer: Zinc chromate type.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

PART 3 EXECUTION

3.1 INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.

B. Apply plastic cement compound between metal flashings and felt flashings.

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 08 31 00 - ACCESS DOORS AND PANELS

A. This section includes the following:

1. Ceiling access door and frame units.

1.2 SUBMITTALS

A. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

B. Manufacturer's Installation Instructions: Indicate installation requirements.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 WALL AND CEILING MOUNTED UNITS

A. Manufacturers:

1. ACUDOR Products Inc.: www.acudor.com/#sle.

2. Babcock-Davis: www.babcockdavis.com/#sle.

3. Nystrom, Inc.: www.nystrom.com/#sle.

4. Or equal.

B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.

1. Material: Steel.

2. Style: Exposed frame with door surface flush with frame surface.

a. Gypsum Board Mounting Criteria: Use drywall bead type frame.

3. Door Style: Single thickness with rolled or turned in edges.

4. Frames: 16 gage, 0.0598-inch, minimum thickness.

5. Single Steel Sheet Door Panels: 1/16-inch, minimum thickness.

6. Steel Finish: Primed.

7. Primed and Field Finish: color match ceiling.

8. Hardware:

a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.

b. Latch/Lock: Screw driver slot for quarter turn cam latch.

c. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.2 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.3 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 09 05 61 - COMMON WORK RESULTS FOR FLOORING PREPARATION

A. This section includes the following:

1. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:

a. Resilient tile and sheet.

2. Preparation of existing concrete floor slabs for installation of floor coverings.

3. Testing of concrete floor slabs for moisture and alkalinity (pH).

4. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.

a. Shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under 's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

5. Remedial floor coatings.

1.2 REFERENCE STANDARDS

A. ASTM F710.

B. ASTM F1869.

1.3 SUBMITTALS

A. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:

1. Moisture and alkalinity (pH) limits and test methods.

2. Manufacturer's required bond/compatibility test procedure.

B. Testing Agency's Report:

1. Description of areas tested; include floor plans and photographs if helpful.

2. Summary of conditions encountered.

3. Moisture and alkalinity (pH) test reports.

4. Copies of specified test methods.

5. Recommendations for remediation of unsatisfactory surfaces.

6. Submit report to Owner or Owner's representative.

7. Submit report not more than two business days after conclusion of testing.

C. Adhesive Bond and Compatibility Test Report.

1.4 QUALITY ASSURANCE

A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by.

B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.

1. Submit evidence of experience consisting of at least three test reports of the type required, with project Owner's project contact information.

C. Responsibility Relating to Independent Agency Testing:

1. Provide access for and cooperate with testing agency.

2. Confirm date of start of testing at least 10 days prior to actual start.

3. Allow at least four business days on site for testing agency activities.

4. Achieve and maintain specified ambient conditions.

5. Notify when specified ambient conditions have been achieved and when testing will start.

1.5 FIELD CONDITIONS

A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.

B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.1 MATERIALS

A. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.

PART 3 EXECUTION

3.1 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:

1. Preliminary cleaning.
2. Moisture vapor emission tests; one test in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
3. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
4. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
5. Specified remediation, if required.
6. Patching, smoothing, and leveling, as required.
7. Other preparation specified.
8. Adhesive bond and compatibility test.
9. Protection.

B. Remediations:

1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.

2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.

3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.2 PRELIMINARY CLEANING

A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.

B. Do not use solvents or other chemicals for cleaning.

3.3 MOISTURE VAPOR EMISSION TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F1869 and as follows.

D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed three pounds per 1000 square feet per 24 hours.

F. Report: Report the information required by the test method.

3.4 ALKALINITY TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Owner's convenience.

C. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.

D. Place several drops of water on a clean surface of concrete, forming a puddle approximately one-inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.

E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.5 PREPARATION

A. See individual floor covering section(s) for additional requirements.

B. Comply with requirements and recommendations of floor covering manufacturer.

C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.

D. Do not fill expansion joints, isolation joints, or other moving joints.

3.6 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

3.7 APPLICATION OF REMEDIAL FLOOR COATING

A. Comply with requirements and recommendations of coating manufacturer.

3.8 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 09 21 16 - GYPSUM BOARD ASSEMBLIES

A. This section includes the following:

1. Metal stud wall framing.
2. Gypsum wallboard.
3. Joint treatment and accessories.

1.2 RELATED REQUIREMENTS

A. Section: Wood blocking product and execution requirements.

B. Section: Acoustic insulation.

1.3 REFERENCE STANDARDS

A. ASTM C475/C475M.

B. ASTM C645.

C. ASTM C754.

D. ASTM C840.

E. ASTM C954.

F. ASTM C1002.

G. ASTM C1396/C1396M.

H. ASTM D3273.

I. GA-216.

1.4 SUBMITTALS

A. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

1. See PART 3 for finishing requirements.

2.2 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:

1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.

2. Or equal.

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.

1. Studs: "C" shaped with flat or formed webs with knurled faces.

2. Runners: U shaped, sized to match studs.

3. Furring: Hat-shaped sections, minimum depth of 7/8".

C. Partition Head to Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

2.3 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:

1. CertainTeed Corporation: www.certainteed.com.

2. Georgia-Pacific Gypsum: www.gpgypsum.com.

3. USG Corporation: www.usg.com.

4. Or equal.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.

2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

a. Mold resistant board is required Break Room 80.1.

3. Thickness:

a. Vertical Surfaces: 5/8-inch.

4. Mold Resistant Paper Faced Products:

a. Georgia-Pacific Gypsum; ToughRock Mold-Guard.

b. National Gypsum Company; Gold Bond XP Gypsum Board.

c. Or equal.

2.4 ACCESSORIES

A. Acoustic Insulation: As specified in Section.

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

1. Products:

a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/sle.

b. Or equal.

C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

1. Tape: wide, creased paper tape for joints and corners, except as otherwise indicated.

2. Ready-mixed vinyl-based joint compound.

D. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033-inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112-inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs at 24 inches on center.

1. Extend partition framing to structure where indicated and to ceiling in other locations.

2. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.

C. Blocking: Install wood blocking for support of:

1. Framed openings.

2. Wall mounted cabinets.

3. Plumbing fixtures.

4. Wall mounted door hardware.

3.3 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.4 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

3.5 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.

2. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

1. Feather coats of joint compound so that camber is maximum 1/32-inch.

C. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.6 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8-inch in 10 feet in any direction.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 09 65 00 - RESILIENT FLOORING

A. This section includes the following:

1. Resilient tile flooring.

2. Static control resilient tile flooring.

3. Resilient base.

4. Installation accessories.

1.2 RELATED REQUIREMENTS

A. Section: Independent agency testing of concrete slabs, removal of existing floor coverings, cleaning, and preparation.

B. Section: Grounding and bonding of static control flooring to building grounding system.

1.3 REFERENCE STANDARDS

A. ASTM F710.

B. ASTM F1700.

C. ASTM F1861.

1.4 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

B. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

1.6 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.1 TILE FLOORING

A. Vinyl Tile: Luxury Vinyl Tile.

1. Manufacturers:

a. Basis of Design: Uncommon Ground by Shaw.

2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.

3. Plank Size: 4 by 36 inch.

4. Total Thickness: 0.125-inch.

5. Color: As indicated on drawings.

B. Static Control Tile: Homogeneous; color and pattern throughout thickness.

1. Basis of design iQ Granit SD by Tarkett.

2. Minimum Requirements: Solid vinyl tile complying with ASTM F1700, Class 1, Type A.

3. Electrical Resistance:

a. Dissipative Tile: Resistance between 1.0 megohms and 1000 megohms as tested in accordance with ASTM F150.

4. Tile Size: 24 by 24 inches.

5. Total Thickness: 0.125-inch.

6. Color: As indicated on drawings.

2.2 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.

1. Manufacturers:

a. Burke Flooring: www.burkeflooring.com.

b. Johnsonite, a Tarkett Company: www.johnsonite.com.

c. Roppe Corp: www.roppe.com.

d. Or equal.

2. Height: 4 inches.

3. Thickness: 0.125-inch.

4. Finish: Satin.

5. Length: Roll.

6. Color: As indicated on drawings.

2.3 ACCESSORIES

A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

B. Moldings, Transition and Edge Strips: Same material as flooring.

C. Copper Grounding Strips: Type and size as recommended by static control flooring manufacturer.

D. Floor Polish for Static Control Flooring: Fluid-applied polish, intended to protect electrical properties of flooring, as recommended by static control flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.

1. Test in accordance with Section.

2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.2 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to manufacturer installation guide for grounding and bonding to building grounding system.

E. Fit joints and butt seams tightly.

F. Set flooring in place, press with heavy roller to attain full adhesion.

G. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

H. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.3 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

3.4 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.5 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.6 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 09 91 23 - INTERIOR PAINTING

A. This section includes the following:

1. Surface preparation.

2. Field application of paints, stains, and varnishes.

3. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

4. Do Not Paint or Finish the Following Items:

a. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.

b. Items indicated to receive other finishes.

c. Items indicated to remain unfinished.

d. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.

e. Floors, unless specifically indicated.

f. Glass.

g. Concealed pipes, ducts, and conduits.

1.2 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D.

B. ASTM D4442.

C. MPI (APSM).

D. SSPC-SP 1.

E. SSPC-SP 6.

1.3 SUBMITTALS

A. Product Data: Provide complete list of products to be used, with the following information for each:

1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").

2. MPI product number (e.g. MPI #47).

3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

B. Samples: Submit two paper chip samples, in size illustrating range of colors and textures available for each surface finishing product scheduled.

C. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of and a maximum of, in ventilated area, and as required by manufacturer's instructions.

PART 2 PRODUCTS

2.1 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.

1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Supply each paint material in quantity required to complete entire project's work from a single production run.

3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:

1. Provide paints and finishes that comply with the most stringent requirements specified in the following:

a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Colors: As indicated on drawings.

2.2 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, uncoated steel, and shop primed steel.

1. Two top coats and one coat primer.

2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.

3. Primer: As recommended by top coat manufacturer for specific substrate.

B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:

1. Medium duty applications include door frames.

2. Two top coats and one coat primer.

3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.

C. Paint I-TR -W - Transparent Finish on Wood.

1. Stain: Semi-Transparent Stain for Wood; MPI #90.

2.3 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Gypsum Wallboard: 12 percent.

2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

F. Ferrous Metal:

1. Solvent clean according to SSPC-SP 1.

2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

G. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.3 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

D. Sand wood and metal surfaces lightly between coats to achieve required finish.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 10 26 01 - WALL AND CORNER GUARDS

A. This section includes the following:

1. Corner guards.

1.2 SUBMITTALS

A. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.

B. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Wall and Corner Guards:

1. Construction Specialties, Inc: www.c-sgroup.com.

2. Inpro: www.inprocorp.com.

3. Or equal.

2.2 COMPONENTS

A. Corner Guards - Surface Mounted:

1. Material: High impact vinyl with full height extruded aluminum retainer.

2. Width of Wings: Two inches.

3. Corner: Radiused.

4. Color: As selected from manufacturer's standard colors.

5. Length: One piece.

6. Preformed end caps.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.

B. Position corner guard above finished floor to 6 feet-4 inches high.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 10 51 29 - PHENOLIC LOCKERS

A. This section includes the following:

1. Phenolic lockers.

1.2 REFERENCE STANDARDS

A. ASTM E84.

1.3 SUBMITTALS

A. Product Data: Manufacturer's published data on locker construction, sizes and accessories.

B. Shop Drawings: Indicate locker plan layout, numbering plan and combination lock code.

C. Samples: submit color selector of full range of standard colors.

D. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.1 LOCKER APPLICATIONS

A. Student Lockers: Two tier lockers, free-standing with matching closed base.

1. Width: 15 inches.

2. Depth: 18 inches.

3. Height: 72 inches.

4. Fittings: Hat shelf, two coat hooks.

5. Locking: Padlock hasps, for padlocks provided by Owner.

6. Provide sloped top.

2.2 PHENOLIC LOCKERS

A. Lockers: Factory assembled, made of phenolic core panels with mortise and tenon joints and stainless steel mechanical joint fasteners; fully finished inside and out; each locker capable of standing alone.

1. Doors: Full overlay, covering full width and height of locker body; square edges.

2. Panel Core Exposed at Edges: Machine polished, without chips or tool marks; square edge unless otherwise indicated.

3. Where locker ends or sides are exposed, finish the same as fronts or provide extra panels to match fronts.

4. Ventilation: By holes drilled in tops, bottoms, and intermediate shelves, and by open space between the back of door and locker body.

5. Door Color: As selected by; allow for two different colors.

6. Body Color: Manufacturer's standard white or light color.

7. Fasteners for Accessories and Locking Mechanisms: Tamperproof type.

B. Component Thicknesses:

1. Doors: 1/2-inch minimum thickness.

2. Locker Body: One of the following combinations:

a. Tops, bottoms, and shelves 3/8-inch; sides and backs 5/16-inch; minimum.

b. Tops, bottoms, and shelves 1/2-inch; sides 3/8-inch; backs 1/4-inch; minimum.

C. Phenolic Core Panels: Nonporous phenolic resin and paper core formed under high pressure, with natural colored finished edges, integral melamine surface, matte finish, and uniform surface appearance; glued laminated panels not acceptable.

1. Surface Burning Characteristics: Flame spread index of 75 or less, and smoke developed index of 450 or less; when tested in accordance with ASTM E84.

D. Hinges: Stainless steel, satin finish; minimum of 90 degree opening; either exposed barrel 5-knuckle hinge attached to back of door and inside of body with tamperproof screws, or completely concealed cabinetwork style hinge attached with tamperproof screws.

E. Number Plates: Manufacturer's standard, minimum 4-digit, permanently attached with adhesive; may be field installed.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install lockers plumb and square.

C. Place and secure on prepared base.

D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds.

E. Bolt adjoining locker units together to provide rigid installation.

F. Install end panels, filler panels, and sloped tops.

G. Install accessories.

H. Replace components that do not operate smoothly.

3.2 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 12 35 30 - RESIDENTIAL CASEWORK

A. This section includes the following:

1. Kitchen cabinets.

2. Casework hardware.

1.2 REFERENCE STANDARDS

A. BHMA A156.9.

B. KCMA A161.1.

1.3 SUBMITTALS

A. Product Data: Provide component dimensions, configurations, construction details, and joint details.

B. Shop Drawings: Indicate casework locations, large scale plans, elevations, clearances required, rough-in and anchor placement dimensions and tolerances.

1.4 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Cabinet Construction: Softwood lumber framing and particle board, tempered hardboard gables.

B. Door and Drawer Fronts: Solid wood.

2.2 HARDWARE

A. Hardware: BHMA A156.9.

B. Shelf Brackets: Vertical chrome steel standards with chrome steel arms.

C. Drawer and Door Pulls: Chrome wire pulls, four inches wide.

D. Catches: Magnetic.

E. Drawer Slides: Extension arms, steel and ball bearing construction.

F. Hinges: Offset pin.

2.3 FABRICATION

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. Fabricate corners and joints without gaps or inaccessible spaces or areas where dirt or moisture could accumulate.

2.4 FINISHES

A. Exposed To View Surfaces: Plastic laminate color per drawings.

B. Interior Surfaces: Plastic Laminate of manufacturer’s standard color.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install casework, components and accessories in accordance with manufacturer's instructions.

B. Set casework items plumb and square, securely anchored to building structure.

3.2 ADJUSTING

A. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly.

3.3 CLEANING

A. Clean casework, countertops, shelves, and hardware.

3.4 PROTECTION

A. Do not permit finished casework to be exposed to continued construction activity.

END OF SECTION

PART 1 GENERAL

1.1 SECTION: SCOPE 12 36 00 - COUNTERTOPS

A. This section includes the following:

1. Countertops for manufactured casework.

1.2 REFERENCE STANDARDS

A. ASTM E84.

B. AWI/AWMAC/WI (AWS).

C. AWMAC/WI (NAAWS).

D. ISFA 2-01.

E. NEMA LD 3.

1.3 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Specimen warranty.

B. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.

C. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

D. Installation Instructions: Manufacturer's installation instructions and recommendations.

E. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.6 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 COUNTERTOPS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.

1. Flat Sheet Thickness: 1/2-inch, minimum.

2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.

a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.

b. NSF approved for food contact.

c. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.

d. Color and Pattern: As indicated on drawings.

3. Other Components Thickness: 1/2-inch, minimum.

4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.

5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

2.2 MATERIALS

A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

2.3 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.

1. Join lengths of tops using best method recommended by manufacturer.

2. Fabricate to overhang fronts and ends of cabinets 1-inch except where top butts against cabinet or wall.

3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.

1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.

2. Height: 4 inches, unless otherwise indicated.

C. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Seal joint between back/end splashes and vertical surfaces.

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 20 01 00 - OPERATION AND MAINTENANCE FOR MECHANICAL

A. This Section covers form, content, and submittal of mechanical system Operation and Maintenance Manuals.

PART 2 PRODUCTS

2.1 FORM

A. Arrange operation and maintenance data sequentially by Specification Section.

B. Separate each item with consecutively numbered heavy stock divider sheets with plastic index tab. Type item number on both sides of paper inserts.

C. Precede each item with a completed Item Data Sheet. See required format attached to the end of this Specification Section.

D. Material included shall indicate the specific item(s) utilized for this Project. Delete or cross out all other items.

E. Provide complete operation and maintenance manual submittals. Partial or incomplete submittals required under this Section will be returned without review.

2.2 DATA

A. Provide data for all items, equipment, and equipment components specified or indicated under this Division, so that the Owner's maintenance personnel will have complete service and replacement information required for routine maintenance and repair and to provide maximum usable life. Include data not only for maintainable and repairable items, but also for replaceable but not repairable items. Typical items for which information is required include:

1. Equipment including all components and accessories such as motors, pulleys, belts, couplings, switches, etc.

2. Valves, meters, steam traps, thermometers, pressure gauges, strainers, filters, and other piping accessories.

3. Plumbing fixtures including fixtures, faucets, flush valves, floor drains, cleanouts, roof drains, and other components.

4. Ventilation system terminal units including VAV boxes, etc.

5. Storage tanks and accessories.

6. Filters and duct accessories.

7. Control components and As-built point-to-point Control Drawings. Provide a copy of the Sequence of Operations with Control Drawings.

B. Include the following data for each item as applicable. Some of these data can be extracted from equipment review submittals and included with the Operation and Maintenance Manuals.

1. Manufacturer's catalog literature and illustrations.

2. Operating characteristics including capacity data, performance curves, flow rates, pressure drops, etc.

3. Electrical characteristics and wiring diagrams.

4. Dimensions and connection sizes.

5. Installation and adjustment instructions, requirements, and recommendations.

6. Parts lists and assembly Drawings.

7. Maintenance, operational, and troubleshooting instructions.

8. Warranty data.

C. Data shall be as provided by the equipment manufacturer or supplier.

D. Data are required for all component items of equipment whether or not the components are products of the equipment manufacturer.

E. All material must be clearly readable. "Faxed" then photocopied information is not acceptable.

F. Include an equipment schedule, neatly typed and arranged by system, listing new equipment with equipment symbol, nomenclature, function and area served, location, manufacturer, nameplate data including model and serial number and motor data including full load amps, horsepower, volts and phase.

G. Include a valve schedule, neatly typed and arranged by system, listing new valve tags with information required on valve tag plus location and normal position, open or closed.

2.3 BINDING

A. Bind the Operation and Maintenance Manuals in three ring, D-ring style binders with page lifters and vinyl covers. Expandable catalog type two-hole binders with soft board covers and metal prong fasteners will not be accepted.

B. Provide multiple binders as required to limit single binder thickness to three inches. Divide binders at logical points. Do not overfill binders.

C. Label the front cover and end panel. Label to include Project title, Project number, date, and facility name.

PART 3 EXECUTION

3.1 REQUIRED COPIES AND TIMING

A. Review Submittals:

1. Submit one electronic copy (PDF format) of the Operation and Maintenance Manual for review and acceptance by the Contracting Officer. Electronically Index (Bookmark) each section and item, by item data number and name within the electronic submittal.

2. Submit for review not less than thirty days prior to Substantial Completion Inspection.

B. Final Operation and Maintenance Manuals:

1. Provide five complete, reviewed, corrected and accepted Operation and Maintenance Manuals to the Contracting Officer a minimum of five working days prior to Project Substantial Completion Inspection and 5 working days prior to any scheduled training on equipment covered by the Operations and Maintenance Manual.

2. Provide three complete digital copy's (PDF format) of the accepted Operation and Maintenance Manuals to the Contracting Officer as part of the Final Operation and Maintenance Manual submittal. Provide digital copies on Compact Disc (CD) or USB compatible memory card (Flash).

END OF SECTION

ATTACHMENT: ITEM DATA SHEET

ITEM DATA SHEET

1. Item name/Drawing equipment number:

2. Specification section/Drawing number:

3. Manufacturer/model number:

4. Size/capacity:

5. Use and location: (1)

6. Spare parts source:

7. Providers of warranty service:

8. Other Contractor comments:

(1) This information must be provided for all items. Be specific as possible.

PART 1 GENERAL

1.1 SCOPE: SECTION 20 05 00 - COMMON WORK RESULTS

A. This Section covers general mechanical requirements for Work covered under Divisions 20, 21, 22, and 23.

B. All Work and services specifically covered under this Division is supplementary to that covered under other Divisions of these Contract Documents. The requirements of this Division which are more stringent than that covered under other parts of these Contract Documents apply to Work covered under this Division.

C. All incidental Work required but not specified under this Division shall comply with the Division in which it is specified.

D. Review the Drawings and Specifications of all other Divisions for additional Work under Division 20.

1.2 GENERAL REQUIREMENTS

A. Provide the Owner with complete, coordinated, operating, balanced, tested, and adjusted mechanical systems.

B. Place all equipment in operation and instruct the Owner's maintenance personnel as to the proper operation, periodic maintenance, and lubrication of new mechanical equipment and systems.

C. The Drawings are somewhat diagrammatic and do not attempt to show all offsets or fittings required for installation of the mechanical system. Furnish and install pipes and ducts with fittings required for complete and proper installation of mechanical systems specified or required under this Division.

D. Provide piping, ductwork, equipment, and accessories indicated on the Drawings unless it is specifically indicated that the piping, ductwork, equipment, or accessory is existing.

E. Install piping, ductwork, and equipment in accordance with manufacturer's recommendations, with accessories recommended by the manufacturer for service intended, and with accessories indicated. Should recommendations conflict with Contract Documents, contact Contracting Officer for clarification before proceeding.

F. Coordinate the installation of the mechanical systems with the Work of other trades and existing conditions. Route mechanical systems as required to avoid interference with the Work of other trades and existing conditions.

G. Provide access to concealed piping accessories, duct accessories, and equipment requiring access for periodic maintenance, inspection, replacement, or adjustment. Furnish access panels/doors of the proper type and size for the application. See Division 08.

H. Do not scale the Mechanical Drawings. Verify dimensions as construction progresses.

I. Refer to the Architectural and Structural Drawings in regards to partition thicknesses, dimensions and other details of the building construction.

J. Report any errors, discrepancies, or ambiguities to the Contracting Officer, who will answer all questions and interpret intended meaning of these Contract Documents. Accept Contracting Officer's interpretation as final.

K. Perform Work in a neat and workmanlike manner with skilled craftsmen specializing in said Work.

L. Provide new equipment and materials direct from the manufacturer unless specifically indicated otherwise. Remanufactured equipment and materials are specifically not acceptable.

M. Provide the product of only one manufacturer for each item or type of item provided in quantity.

N. Where the selection of materials or methods is left to the discretion of the Contractor, faithfully pursue the use of the best available materials or methods suitable for the purpose intended.

1.3 LOCAL CONDITIONS

A. Bidders shall familiarize themselves with the Contract Documents and existing conditions which affect Work required by the Contract Documents. It will be assumed that bidders have made a personal examination of the jobsite and existing conditions.

B. Failure to visit the jobsite will in no way relieve the successful bidder from the necessity of furnishing any materials or performing any Work that may be required to complete the Work in accordance with the Contract Documents with no additional cost to the Owner.

1.4 PERMITS, TESTING, AND INSPECTIONS

A. Obtain, pay for, and comply with the requirements of all permits, fees and inspections by public authorities required for the Work covered under this Division of the Specifications.

B. Transmit copies of permit applications, permits received, and public authority inspection reports to the Contracting Officer.

C. Test mechanical systems in accordance with the most restrictive procedures as defined under applicable codes or as specified elsewhere under this Division.

1. Provide a minimum of three working days' notice to Contracting Officer and public authorities prior to performance of test.

2. If less than required notice is given, the Contracting Officer may require the Contractor to repeat the test at no additional cost to the Owner.

3. Test Work prior to insulating or concealing. If less than required notice is given prior to insulating or concealing, the Contracting Officer may require the Contractor to uncover such Work for inspection and recover same at no additional cost to the Owner.

4. Submit certificate of compliance for all tests indicating system tested, results of tests, witnesses and dates prior to calling for Substantial Completion and final inspections.

5. During testing, isolate piping system equipment and accessories that are not rated to withstand test pressures or perform test prior to connection of such equipment and accessories to the piping system.

D. Substantial Completion and Final Inspections:

1. Provide minimum of 14 calendar days' notice to Contracting Officer and public authorities of intent to have Work ready for inspection. Confirm that Work will be ready for inspection a minimum of 3 working days' notice prior to requested inspection.

2. Prior to inspection:

a. Deliver to the Contracting Officer required equipment, Drawings, and records.

b. Clean fixtures and equipment. Remove manufacturer's stickers and leave free of dust and dirt.

c. Remove boxes, scrap, and other debris.

d. Touch up holidays or damaged painted surfaces.

e. Contractor's Mechanical Administrator, licensed by the State of Alaska, shall review mechanical systems installation for conformance with Contract Documents. With request for inspection, Contractor's Mechanical Administrator shall verify in writing that this review has been performed and note anything not conforming to Contract Documents.

f. With request for re-inspection of Work previously inspected, provide the Owner's previous inspection's deficiency list accompanied by an item by item statement of measures taken to correct the previously listed deficiencies.

g. Deliver to Owner personnel all special tools and devices furnished by the manufacturer with items, specialties or equipment to allow installation, disassembly, adjustment, repair or maintenance. Identify special tools or devices as to item to which it is applicable.

h. Provide mechanical receivables that the Owner is to receive upon completion of the Project. Turn over an inventory list of materials provided for the Owner's use to the Contracting Officer prior to scheduling substantial completion and final inspections.

i. Deliver to the Contracting Officer a Certificate of Instruction signed by all Owner personnel receiving instruction, all Contractor personnel providing instruction, and indicating dates of instruction.

3. During inspection:

a. Provide complete set of current record drawings for use during inspection.

b. Provide complete and operating systems suitable for the season.

c. Demonstrate that the mechanical system performs in accordance with the Contract Documents. Provide material and personnel required to perform the demonstration.

d. Provide assistance to inspection personnel required for a complete and thorough inspection.

1.5 CODES, ORDINANCES, AND STANDARDS

A. Federal, State and local Codes and Ordinances take precedence over these Specifications and Drawings where conflicts occur unless the Drawings or Specifications call for more stringent requirements. Notify the Contracting Officer in writing of conflicts.

B. Follow latest adopted editions of Code of Federal Regulations, Alaska Administrative Code, International Building Code, International Mechanical Code, International Fuel Gas Code, Uniform Plumbing Code, International Fire Code, National Electrical Code, ADA Accessibility Guidelines, NFPA, ASME, NEMA, ASHRAE, SMACNA, etc. as applicable.

C. Comply with all applicable laws, building and construction codes, OSHA Safety and Health Regulations and applicable requirements of any governmental agency under whose jurisdiction this Work is being performed.

1.6 TEMPORARY OPERATION OF FACILITY'S NEW AND EXISTING MECHANICAL SYSTEMS

A. The facility's new and existing mechanical systems may be utilized for temporary heat and ventilation. The system or parts of the system utilized shall be complete in all respects prior to consideration of use.

B. Install indicated filters in all air-handling equipment, including cabinet unit heaters, placed in operation during construction. Install new filters during air balancing and again before acceptance of substantial completion by the Owner. The filters installed at the time of acceptance of substantial completion by the Owner may be those that were used during the air balancing process if these filters are removed once the balancing has been completed and the construction filters are reinstalled.

C. Install temporary 1-inch thick roll filter media over all return and exhaust air intake grills and openings and over all fan intakes. Change filters as required and leave in place until the rooms or areas receive final cleaning for inspection.

D. When each piece of equipment is initially placed in service, measure the motor current draw. If it exceeds the nameplate amperage (not service factor amperage), adjust fan and/or motor sheaves or pump balancing cocks to bring motor current draw below the full load current rating. If this is not possible, stop operation and notify the Contracting Officer.

E. Test, clean, and flush liquid systems prior to utilization.

F. Clean, repair, and lubricate new piping, ductwork, equipment and accessories as required to return the systems to like new condition prior to substantial completion and final inspections.

G. Clean, repair, and lubricate existing piping, ductwork, equipment and accessories as required to return the systems to condition before start of construction prior to substantial completion and final inspections.

H. The Contractor retains all responsibility for providing required maintenance until acceptance of substantial completion by the Owner. Fuel and power consumed during temporary use of the facility's new mechanical systems will be paid for by the Owner. Take steps to conserve energy.

1.7 MECHANICAL COMPLIANCE RECORD

A. Record the performance of all tests, sterilization, cleaning, flushing and refilling of mechanical systems required under this Division.

B. Include date, time and time interval, test results, brief description of method of tests, and witnesses.

C. Submit this record to the Contracting Officer prior to scheduling Substantial Completion and final inspections.

1.8 INSTRUCTION OF OWNER'S PERSONNEL

A. Instruct designated Owner personnel in the proper operation, periodic maintenance and lubrication of the project's mechanical systems, equipment and accessories utilizing an accepted Operations and Maintenance Manual.

B. As instructors, include journeymen plumbers, steam fitters, sheetmetal men, electricians, and control men, each fully knowledgeable of the project's mechanical systems and equipment.

C. Instruct only those Owner personnel specifically designated by the Contracting Officer. Instruction of other Owner personnel will not meet the requirements of this Section.

D. Include system operations; periodic maintenance including locations and techniques; periodic lubrication including materials, methods and locations; location of concealed valves, instruments, dampers, etc.; location of electrical breakers and disconnects associated with mechanical equipment; and location of control items.

E. Include a thorough orientation of the Control Drawings accompanied by a demonstration of the interrelationships of all control devices including sensors, relays, controllers, operators, etc. Locate control equipment shown in the Control Drawings and demonstrate full operation of control devices and systems.

F. Instruct Owner personnel for a minimum of two hours plus that required by other sections of this Division of the Specifications.

G. Schedule the instruction period in the same manner as for system tests. The Contractor is obligated to only one instruction period. The instruction period may be divided into more than one period with the concurrence of the Contracting Officer.

1.9 RECORD DOCUMENTS

A. When submitting record documents required by Section 01 70 00 “General Requirements,” also submit reproducible As-built Drawings of Contractor designed systems such as fire protection systems and control systems.

B. Add the following to the list of items required by Section 01 70 00 “General Requirements” that be legibly marked on Contract Drawings:

1. Changes made to equipment identification assignments, replacing Contract Document assigned equipment designations, at each location that designation occurs.

2. Valve numbering for each valve assigned a number at each location shown on the Drawings.

C. Correct Record Documents as required and deliver to the Contracting Officer. Documents shall bear a statement signed and dated by a legal representative of the Contractor indicating that the Record Documents reflect "as-built" conditions.

1.10 WARRANTY

A. All manufacturer and supplier standard equipment, item or accessory warranties covered under this Division shall be the Contractor's responsibility under Project warranty period.

B. Equipment, item, or accessory warranties shall commence upon the date of Final Acceptance by the Owner.

C. Transfer all manufacturer and supplier standard equipment, item or accessory warranties to the Owner upon expiration of Project warranty period.

D. Any warranties, more stringent than manufacturer's standard, specified or indicated under this Division remain the responsibility of the Contractor before and after expiration of Project warranty period.

E. Minimum manufacturer or supplier warranty is that of the manufacturer or supplier used as the basis of design.

1.11 MECHANICAL WORK IN EXISTING FACILITIES

A. Carefully lay out Work in advance.

B. Verify existing conditions affecting Work, including existing sizes and materials indicated, prior to beginning Work or ordering materials that are affected by existing conditions. Beginning of Work means acceptance of existing conditions. Match existing products and Work unless otherwise noted. Notify Contracting Officer of conflicts in writing.

C. Verify locations and elevations of utilities that are crossed or connected to prior to installation of new Work.

D. When portions of existing mechanical, electrical, structural, etc. conditions are shown, it is not meant to indicate that all of such systems are shown.

E. Where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings or other surfaces is necessary for the proper installation, support or anchorage of the mechanical equipment, piping, or ductwork, carefully perform this Work and patch to match existing conditions.

F. Repair any damage to building, piping, or equipment with skilled mechanics of the appropriate trade.

G. Coordinate connection of new services to existing building systems, including required systems shut downs, with the Contracting Officer. Limit required shut down periods to a minimum. Isolate, drain, and refill existing systems as required to accommodate Work. Restore existing systems to full operational condition.

H. Cut, move, or remove existing items as necessary for installation of new Work and restore and replace at completion.

I. Remove from site removed materials unless otherwise indicated that the material is to be salvaged for the Owner.

J. Remove, cut, and patch in a manner to minimize damage and to provide means of restoring items to original conditions.

K. Replace existing mechanical insulation that is removed to accomplish Work with new insulation matching existing.

L. Remove piping and ductwork connected to or serving fixtures or equipment being removed and other piping and ductwork being removed, back to its main or connection to a still active branch and cap. Remove associated hangers and supports. Patch, to match existing, pipe or ductwork insulation on mains at removed branch lines. If such piping or ductwork is connected to mains or still active branches in areas that are not accessible or that are not being made accessible, then remove piping and ductwork into area of non-accessibility and cap. Patch, to match existing, openings in walls, ceilings, or floors left or created as a result of piping or ductwork removal.

M. Remove piping, other than waste and vent piping, that is being removed and that extends below slab-on-grade to below top of slab, cap pipe, and patch slab to match existing.

N. Remove slab-on-grade floor drains that are being removed to below slab, plug pipe with concrete, and patch slab to match existing.

O. Provide wall framing around new openings through existing walls cut to accommodate new ductwork. Match existing materials. Cut and patch existing wall sheathing and finish to match existing.

1.12 EXPOSED PIPING, DUCTWORK, EQUIPMENT, AND ACCESSORIES

A. Exposed piping, ductwork, equipment, and accessories have been sized, routed, and coordinated to provide a neat, clean architectural appearance.

B. Fabricate and install exposed piping, ductwork, equipment, and accessories so that finished product exhibits a quality, craftsmanship, and appearance aesthetically acceptable to the Contracting Officer and suitable for final finishing. Finishing covered under Division 09 00 00.

1.13 ASBESTOS FREE MECHANICAL SYSTEMS

A. Provide mechanical systems that do not contain asbestos or asbestos-containing materials.

1.14 PROJECT COMPLETION DOCUMENTATION AND MATERIAL TURN OVER

A. See individual specification sections for required project completion documentation, and required maintenance or spare parts to be turned over to the Contracting Officer, including the following:

1. Record documents and reports:

a. Record documents – Section 20 05 00 “Common Work Results.”

b. Testing, Adjusting and Balancing Report – Section 23 05 93 “Testing, Adjusting and Balancing for HVAC.”

c. Sterilization testing certificate – Section 22 11 16 “Domestic Water Piping.”

d. Conformed O&M manuals – Section 20 01 00 “Operation and Maintenance for Mechanical.”

e. Test performance records for sterilization, cleaning, flushing and refilling of mechanical systems – Section 20 05 00 “Common Work Results.”

2. Training completion record:

a. Mechanical instructions training completion record – Section 20 05 00 “Common Work Results.”

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 20 05 11 - COMMON SUBMITTAL REQUIREMENTS FOR MECHANICAL

A. This Section covers required mechanical equipment review submittals of material, equipment, items and accessories covered under this Division for review by the Contracting Officer to determine conformance with the Project design concepts and Contract documents prior to commencement of Work under this Division.

PART 2 PRODUCTS

2.1 FORM

A. Each equipment review submittal or resubmittal shall be indexed, tabbed, and bound copies of data, Drawings, and materials lists. Alphabetize the index by item name and list the Specification Section and item number under which each item is submitted.

B. Submittal information is required for all material and equipment specified or indicated on the Drawings.

C. Organize submittals by Specification Section. Separate each Section by a heavy stock divider sheet with plastic index tab. Type Specification Section numbers on both sides of paper inserts.

D. Identify each item of the submittal with an item number. Number the first item within a Specification Section "#1", the second item within a Specification Section "#2", and so forth. Restart numbering sequence with each Specification Section. Type item numbers on both sides of paper inserts.

E. Include equipment indicated on the Drawings, but not covered by a Specification Section, with the appropriate volume under a tab marked "Drawings." Rules for item numbering and item data sheets apply.

F. Precede each item with a completed Item Data Sheet. See required format attached to the end of this Specification Section.

G. Material submitted shall indicate the specific item(s) proposed for this Project. Delete or cross out all other items.

H. The mechanical equipment review submittal may be divided and submitted in the following volumes. Simultaneous submittal of all volumes is not required. Further division of the submittal into separate volumes is not permitted.

1. Section 20.

2. Section 21.

3. Section 22.

4. Section 23

I. Long lead mechanical equipment may be submitted for review in a separate volume. Include all long lead items in a single volume that is indexed, tabbed and bound as required for regular mechanical equipment review submittals. Maintain the long lead item submittal as a separate volume throughout the submittal review process; do not incorporate into the regular mechanical equipment review volumes.

J. Each submittal or resubmittal of each volume shall be complete and shall contain all previously submitted material except that being replaced by new or revised material which shall be removed. Partial or improperly indexed or tabbed submittals or resubmittals shall be rejected without review or comment.

K. With each resubmittal include a complete summary of all changes and additions made to the equipment review submittal since the previous submittal. Only those items included in the summary will be reviewed with the resubmitted package.

L. Do not submit "updates" for previous submittal packages with resubmittals. Previous submittals will not be updated.

2.2 DATA

A. Include the following data for each item as applicable:

1. Manufacturer and model number.

2. Drawing equipment number.

3. Catalog literature.

4. Operating characteristics including capacity data, performance curves, flow rates, pressure drops, etc.

5. Electrical characteristics and wiring diagrams.

6. Dimensions and connection sizes.

7. Installation and adjustment instructions, requirements and recommendations.

8. Warranty data.

B. A list of minimum submittals required is provided in each Section. These lists are not necessarily complete or all inclusive and the Contractor is responsible for complete submittal.

PART 3 EXECUTION

3.1 REQUIRED COPIES AND TIMING

A. Submit one electronic copy (PDF format) of the Mechanical Equipment Review Submittal or resubmittal for review and acceptance by the Contracting Officer. Electronically Index (Bookmark) each section and item within the electronic submittal.

B. Materials submitted shall be reviewed and accepted by the Contracting Officer before Contractor releases material for fabrication or shipment.

END OF SECTION

ATTACHMENT: ITEM DATA SHEET

ITEM DATA SHEET

1. Item number:

2. Item name/Drawing equipment number:

3. Specification section/Drawing number:

4. Manufacturer/model number:

5. Use and location: (1)

6. Spare parts source:

7. Providers of warranty service:

8. Proposed deviations from the Contract Documents: (2)

9. Other Contractor comments:

10. Contractor Certification: (3)

The undersigned Contractor Representative certifies that he has reviewed the attached information and has determined that the proposed material complies with the requirements of the Contract Documents; he has coordinated installation of the material with the work of other trades and existing conditions; he has determined and verified field measurements, field construction criteria, manufacturer's installation requirements affecting the proposed material; and has notified the Contracting Officer of conflicts.

_____

Contractor Representative's Signature

(1) Unless otherwise indicated, provide this information only when the product's use and location is not obvious.

(2) If this section is left blank it will be assumed that proposed equipment is exactly as specified and indicated on the Drawings.

(3) The Contractor referenced here is the General Contractor for the project. The signature of a subcontractor representative is not acceptable.

PART 1 GENERAL

1.1 SCOPE: SECTION 20 05 13 - COMMON MOTOR REQUIREMENTS FOR MECHANICAL

A. This Section covers selection and installation of electric motors and starters provided under this Division as an integral part of specified equipment.

PART 2 PRODUCTS

2.1 ELECTRIC MOTORS

A. Provide electric motor driven equipment being furnished and installed under Division 22 and 23, complete with electric motors unless otherwise indicated. US Motors, TECO Westinghouse, Baldor, or equal.

B. Motor bearings: Ball type, permanently lubricated and sealed or greased with zerk type lubricating fittings extended to an easily accessible, single point location for field servicing. 100,000 hour, L-10 life.

C. Except for direct connected motors, provide motors complete with adjustable slide rails.

D. Single speed, 1750 RPM unless indicated otherwise.

E. Sized to meet the horsepower requirements of driven unit at design characteristics including all start-up, V-belt and/or drive and coupling losses, which are incurred without loading the motor beyond its nameplate horsepower rating. Minimum motor size shall be that scheduled or otherwise indicated.

F. Provide with motor horsepower nameplate ratings not less than 110 percent of the driven unit brake horsepower requirements where V-belt drives are employed.

G. Rated for continuous duty at 100 percent of rated capacity with temperature rise based on an ambient temperature of 40 degrees C.

H. Three phase electric motors: Open drip proof, unless otherwise indicated or unless otherwise required to meet UL listing for use to which it is put or location in which it is installed. Squirrel cage induction type, designed for use with indicated voltage, 3-phase, 60 Hertz alternating current.

I. Provide premium efficiency rated motors with base mounted circulating pumps and air handling equipment requiring motors one horsepower and larger. Baldor, TECO Westinghouse, U.S. Motor, or equal.

J. Motors for equipment served by variable frequency drives:

1. NEMA rated, inverter compatible, premium efficiency suitable for VFD operation, 1750 RPM, squirrel cage-induction motors. Baldor, TECO Westinghouse, U.S. Motor or equal.

2. Compatible with variable frequency drive specified. Rated for minimum 10:1 turndown under variable torque conditions.

3. 1.15 service factor (sine wave), 1.0 service factor pulse width modulated power.

4. Moisture resistant, 200 degree C rated copper windings. Class F insulation materials with Class B rise meeting NEMA section MG1 part 31.4.4.2 for variable frequency drive operation.

5. Efficiency: Meet or Exceed NEMA minimum efficiencies listed in MG1-1993 12.58.2 efficiency tables as tested in accordance with MG-1993 12.58.1.

6. Motor bearings: Ball type, permanently lubricated and sealed or greased with zerk type lubricating fittings extended to an easily accessible, single point location for field servicing. Provide bearings with 100,000 hour, L-10 life.

7. Cast iron frame, end plates, and fan cover.

8. Oversized, gasketed, cast iron conduit box.

9. Polypropylene, bi-directional fan, keyed to motor shaft.

PART 3 EXECUTION

3.1 INSTALLATION

A. Conform to the requirements of Division 26 and the National Electric Code.

B. Mount motors driving vibration isolated equipment on the same rigid frame and isolated with associated equipment.

3.2 OPERATION

A. Motors shall draw less than nameplate amperage (not service factor amperage) when operating driven equipment within both mechanical and electrical design parameters for this Project.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 20 05 29 - HANGERS AND SUPPORTS FOR MECHANICAL

A. This Section covers selection, installation, and adjustment of equipment and material used to hang and/or support mechanical systems and equipment.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and Selections for equipment and accessory items.

B. Application Schedule: Hanger and supports schedule indicating the type of product and materials proposed for each size or application.

C. Test Reports:

1. Third party reports or certifications where indicated.

2. Copy of the standard form used for Special Inspection of concrete anchors.

D. Shop Drawings for fabricated pipe or equipment hangers or supports including:

1. Dimensions.

2. Construction details.

3. Materials.

4. Deflection for spring hangers.

5. Rated or design load, actual load and safety factors.

6. Applications.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide factory standard hangers and supports complete with necessary inserts, bolts, nuts, rods, washers, and other accessories. B-Line, Anvil, or equal.

2.2 PIPE HANGERS

A. Pipe hangers placed in direct contact with pipe:

1. Pipe hangers for 8 inches and smaller cast iron and steel pipe: Swivel loop style, galvanized carbon steel. B-Line Figure 2 or equal.

2. Pipe hangers for 6 inches and smaller copper pipe: Swivel loop style, carbon steel, epoxy coated or felt lined, copper colored. B-Line Figure 200F or equal.

B. Pipe hanger placed around insulation:

1. Clevis ring style, electro-galvanized carbon steel. B-Line B3100 or equal.

2. J-Hanger, electro-plated steel, used with B-Line B3151 shield. B-Line B3690.

3. Adjustable band hanger, pre-galvanized steel, used with B-Line B3151 shield. B-Line 3170.

2.3 RISER CLAMPS

A. Riser clamps for copper pipe: Copper-electro plated carbon steel. B-Line B33373CT or equal.

B. Riser clamps for DWV pipe: Carbon steel. B-Line B3373 or equal.

2.4 HANGER RODS

A. Electro-galvanized carbon steel. B-Line ATR or equal.

B. Select equipment hanger rods as required to properly support the equipment in-service load. Select tank, coil, etc. supports assuming that they are full of water when in service.

C. Size equipment hangar rods as follows:

Load/rod	Hanger Rod
0 - 300 pounds	3/8-inch
301 - 600 pounds	1/2-inch
601 - 900 pounds	5/8-inch
901 - 1400 pounds	3/4-inch
1401- 1900 pounds	7/8-inch

D. Size pipe hanger rods as follows:

Pipe Size	Hanger Rod
1/2 to 2 inches	3/8-inch
2-1/2 to 4 inches	1/2-inch
5 to 6 inches	5/8-inch
8 inches	3/4-inch
10 inches	7/8-inch

2.5 CHANNEL STRUTS

A. Fabricated from 0.105-inch thick rolled mild steel. Unistrut, Erico Caddy, Power Strut, or equal. Select as follows for spans up to 7 feet. For longer spans or greater loads submit Shop Drawing for review.

Total Load	Unistrut	Power Strut
0 - 245 pounds	P1000	PS 200
246 - 680 pounds	P1001	PS 200 2T3
681 - 1360 pounds	P1001C41	------

B. Finish: Zinc plated electrostatically for interior applications and hot dipped galvanized after fabrication for exterior applications.

2.6 STEEL STRUCTURE ATTACHMENTS

A. Beam clamps: Malleable/ductile iron with set screw and lock nut and with retainer strap. B-Line Figure 65 and B-Line Figure 66 or equal. Provide retainer strap listed with clamp or provide a steel strap of not less than 16 gauge thickness and not less than 1.0-inch wide for pipe diameters up to 8-inch.

B. Welded beam attachments: Carbon steel. B-Line 50, B3083 or B3083WO or equal.

C. Channel strut beam or truss clamps: Carbon steel with retainer rod and hook. B-Line Figure 40 or equal.

D. Steel truss attachments: Carbon steel fittings compatible with truss.

2.7 CHAIR ANCHORS

A. Carbon steel chair and yolk bolts. B-Line B3147 or equal.

PART 3 EXECUTION

3.1 GENERAL

A. Examine the Architectural Drawings and existing conditions and provide additional structural members or framing required to support the mechanical systems.

B. Hanger spacing:

Metallic Pipe Size (Inches)	Maximum Spacing Between Supports (Feet)
1/2	5
3/4	6
1	7
1-1/4	8
1-1/2	9
2	10
2-1/2	11
3	12
4	14

C. Provide additional support at pump bodies, valves, elbows, bends, and other locations where concentrated loads occur.

D. Where groups of three or more pipes occur, they may be supported with trapeze hangers constructed from channel strut and hanger rods. Space trapeze hangers for smallest pipe supported.

E. Do not support piping four inches size and larger from a single joist or structural member.

F. Support hub and no-hub cast iron piping at each joint, in accordance with above hanger spacing table, or in accordance with coupling manufacturer's recommendations, whichever is more stringent.

G. Support piping with sleeved couplings and grooved end piping at each length of pipe and at each fitting, in accordance with above hanger spacing table, or in accordance with coupling manufacturer's recommendations, whichever is more stringent.

H. At piping penetrating wood framing, cut hole with hole saw and center piping in hole so that piping does not contact wood framing. Provide plastic isolation bushings at distances called for in "Hanger Spacing" table.

I. Seal all penetrations of vapor retarder or membranes vapor tight.

J. Adjust hangers and supports and place grout for concrete supports to bring support to proper elevations.

K. When copper piping is placed in direct contact with channel strut supports, wrap piping at point of contact with two wraps of dielectric pipe wrap.

L. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

3.2 HANGERS ON INSULATED PIPING

A. Place hanger or support in direct contact with the pipe unless specifically indicated that piping is to have continuous insulation. When placed in direct contact install fiberglass insulation around the hangers.

B. With suspended, continuous insulation and hangers / supports, provide calcium silicate insulation segments between the pipes supported and the support. In addition, provide galvanized iron shields between the insulation segments and the supports. Fabricate shields for four inches and larger pipes of 16 gauge iron, 18 inches long. Shields for three inches and smaller pipes of 18-gauge material, 12 inches long. Match the radius of curvature of the shields with the outside radius of the insulation.

3.3 WALL MOUNTED PIPING

A. Unless otherwise indicated, support piping that is installed exposed on walls with channel strut and compatible pipe clamps. Space supports in accordance with "Hanger Spacing" table.

B. Support vertical piping drops within one foot of top of drop and within one foot of bottom of drop and in accordance with "Hanger Spacing" table.

C. Where groups of two or more pipes occur support piping from common channel strut.

D. Secure channel strut to poured concrete walls with expansion anchors, to CMU walls with expansion anchors in grouted cells, and to stud walls with screws into studs or blocking.

E. Cut multiple channel strut supports for a piping run or drop to consistent lengths.

3.4 STEEL STRUCTURES

A. Secure to steel structures through use of beam clamps with retainer strap, channel strut with retainer rod and hook or with welded beam attachments.

B. Bolts and nuts shall conform to ASTM A307 and flat washers are required under all nuts.

C. Weld in accordance with American Welding Society Code AWS D1.1, latest edition, using E70xx electrodes.

D. Verify with steel truss and deck manufacturer's maximum allowable loads on single point support; provide additional steel supports as required to comply with maximum recommended values.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 20 05 48 - SEISMIC CONTROLS FOR MECHANICAL – DEFERRED DESIGN

A. This Section covers calculations, installation, and materials used to seismically restrain mechanical systems and equipment.

1.2 SUBMITTALS

A. Name and contact information of registered engineer providing seismic restraint design services.

B. Manufacturer's Data:

1. Catalog cuts and selections of components for packaged seismic restraint systems and equipment.

C. Application Schedule: Seismic restraint schedule indicating the type of product and materials, proposed for each restraint system and application.

D. Test Reports and Certificates: Third party reports or certifications for concrete anchor bolts and where indicated.

E. Submit plan with location of seismic restraints for distribution systems or submit letter verifying that seismic restrain locations will be field located under the supervision of registered engineer providing seismic restraint design services.

F. Shop Drawings and calculations. Calculations for seismic restraints shall be in accordance with ASCE 7-10.

1. Each equipment anchorage submittal and each submittal for piping and ductwork supports not in accordance with referenced standards shall include the following data unless otherwise indicated:

a. Force calculations. Include equipment tag, equipment weight, center of gravity, seismic constants, and height within structure in calculations.

b. Catalog data indicating operating weight, dimensions, materials and construction details with anchors adequate to resist calculated forces.

G. Restraint Detail Index: Submit an index for equipment weighing over 20 pounds similar to the following example. Where equipment is rigidly mounted to the structure or plenum wall, such as cabinet unit heaters or propeller fans indicate as N/A. Where a detail provided as part of the Contract Documents is used, indicate detail reference. For each piece of equipment indicate anchor diameter, and embed depth where post installed concrete anchors are used.

H. Index Example:

Equipment Symbol	Equipment Type	Detail Tab or Reference	Anchor Diameter	Anchor Embed Depth
AHU-1	Air Handling Unit	2/M5 & 3/M5	1 /2 inch	4 inches
EF-1	Utility Fan	Tab 1	3/8 inch	N/A
RF-1	Propeller Fan	N/A	N/A	N/A
WH-1	Water Heater	6/M5	3/8 inch	N/A

1.3 SEISMIC DESIGN

A. Project is designed in accordance with IBC 2009. Chapter 16 structural provisions references ASCE 7-10 which cover the design of the structural system and the installation of mechanical equipment within the structure.

B. Restrain sprinkler systems in accordance with latest edition of NFPA 13. Attachment of restraint systems for sprinkler piping in accordance with NFPA 13 does not require oversight by a registered engineer.

C. Install mechanical equipment in accordance with ASCE 7-10. This section summarizes the requirements in Chapter 13 for this Project. The design constants for this Project include:

1. The Occupancy Category for this Project is IV.

2. The Seismic Design Category for this Project is D.

3. Use value of SDS = 0. 73X for seismic force calculations.

4. All systems that are not related to life safety or for continued operation are Ip=1.5.

1.4 Systems not requiring seismic restraint

A. Highly expanding systems: Refer to plan drawings for pipe anchor details and locations. Provided details and anchor sizing are designed to take into account both seismic forces and thermal expansion forces as part of an engineered system. Contractor is to provide additional thermal and seismic anchors and calculations for the below piping systems within the mechanical room. Additional anchors for thermal and seismic forces are not required or intended outside of the mechanical rooms.

1. Hydronic heating piping.

B. Equipment exempted from seismic restraint by ASCE 7-10: Chapter 13:

1. All equipment with an Ip = 1.0 weighing 400 pounds or less, mounted at four foot or less above floor level and flexible connectors between the components and associated ductwork, piping and conduit are provided.

2. All equipment with an Ip = 1.0 weighing 20 pounds or less or, for distribution systems, weighing 5 pounds per foot or less and flexible connectors between the components and associated ductwork, piping and conduit are provided.

C. Piping exempted from seismic restraint by ASCE 7-10: Chapter 13:

1. All mechanical components with an Ip = 1.0 weighing less than 20 pounds with flexible connectors between the components and associated piping are provided.

2. Non-ductile piping systems with Ip = 1.0 weighing 5 pounds/foot or less (includes filled water weight):

a. 2-inch or less diameter cast iron piping.

3. High-deformability piping (Steel and Copper) is used with an Ip = 1.0; provisions are made to avoid impact with larger piping or mechanical components or to protect the piping in the event of such impact:

a. Nominal pipe size shall be 3-inch diameter or less.

D. Ductwork exempted from seismic restraint by ASCE 7-10: Chapter 13:

1. Ductwork with an Ip = 1.0 and has a cross-sectional area of less than 6 square feet.

a. Rectangular duct: 28-inch by 30-inch or smaller.

b. Round duct: 32-inch diameter or smaller.

1.5 EQUIPMENT SEISMIC RESTRAINT

A. Equipment shall be supported and attached to withstand seismic forces. Shop Drawings and calculation details for anchorage of equipment shall be submitted in accordance with this section. Shop drawings for restraint within or upon equipment base may be provided by a specialty equipment consultant or equipment manufacturer. For connections to building structure provide shop drawings signed by professional engineer registered in Alaska.

B. Special Certification Requirements for Designated Seismic Systems:

1. In accordance with ASCE 7-10 section 13.2.2 Certifications shall be provided for designated seismic systems assigned to Seismic Design Categories C through F or system is assigned an Ip = 1.5.

C. The component importance factor, Ip, shall be taken as 1.5 if any of the following conditions apply:

1. The component is required to function for life-safety purposes after an earthquake, including fire protection sprinkler systems.

2. The component contains hazardous materials.

3. The component is in or attached to an Occupancy Category IV structure and it is needed for continued operation of the facility or its failure could impair the continued operation of the facility.

1.6 PIPING AND DUCTWORK SEISMIC RESTRAINT

A. General:

1. Verify that the hanger support system and its attachment to the structure are adequate for the gravity load plus the vertical seismic force equal to the maximum horizontal seismic force.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Obtain, pay for, and coordinate special inspection of anchor bolts used for seismic restraint.

B. Submit results of special inspection, indicating date, and anchors inspected, prior to calling for Substantial Completion and final inspections.

C. Examine the Architectural Drawings and existing conditions and provide additional structural members or framing required to support the mechanical systems.

D. Seal all penetrations of vapor retarder or membranes vapor tight.

E. Install anchor bolts in accordance with manufacturers' instructions and third party evaluation report including special inspection as required.

F. Friction clips shall not be used for anchorage.

G. Powder driven fasteners shall not be used in tension load applications.

H. When connecting braces to trusses connect to top cord of truss unless otherwise indicated.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 20 05 53 - IDENTIFICATION FOR MECHANICAL

A. This Section covers the identification of mechanical systems and components.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and selections for identification products and accessory items.

B. Application Schedule: Prior to ordering, submit valve tag schedule indicating the type of service and size proposed for each application.

PART 2 PRODUCTS

2.1 PIPE MARKERS

A. Pressure-sensitive identification markers banded in place with color-coded tape incorporating direction of flow arrows. "Opti-Code" markers and "Arrows On a Roll", Seton Name Plate Corp., Brady, Brimar, or equal. Painted stencil markers are not acceptable.

B. Provide markers of length and with letter size indicated below. Diameter listed is outer diameter of insulation if piping is insulated.

Nominal Diameter	Marker Length	Letter Height
3/4 to 1-1/4-inch	8 inches	1/2-inch
1-1/2 to 2 inches	8 inches	3/4-inch
2-1/2 to 7 inches	12 inches	1-1/4-inch
8 to 10 inches	24 inches	2-1/2 inches
Over 10 inches	32 inches	3-1/2 inches

C. Provide marker with appropriately color-coded background and with a clearly printed legend to identify the contents of the pipe in conformance with the "Scheme for the Identification of Piping Systems" (ANSI A13.1).

2.2 VALVE TAGS AND COLD PIPING ACCESSORY TAGS

A. Laminated plastic with subsurface printing, heavy duty, brass bead chain, and appropriately colored border. Craftmark, Seton, Brimar, or equal.

B. Minimum of 2-inch diameter round tag or 2-inch square tag with maximum three text lines, 0.2-inch high characters, 8 characters per line.

C. On each tag, print valve number and message describing system, function, and equipment and/or area/room served. Message shall be as complete as possible within space available.

D. Number valves sequentially.

2.3 EQUIPMENT LABELS

A. Minimum 1-inch high by 1/16-inch thick, black, laminated plastic with white core. "Setonply" by Seton Nameplate Corp., Craftmark, Brimar, or equal.

B. Engraved with 3/8-inch high characters identifying the item or equipment by symbol and description indicated on the Drawings.

2.4 ACCESS PANEL AND CEILING IDENTIFICATION MARKERS

A. Color coded dots. Avery or equal.

B. Color coded tacks. Craftmark or equal.

C. Color code markers as follows:

1. Dampers and ventilation devices: Blue.

2. Plumbing valves and devices: Green.

3. Heating valves: Yellow.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

A. Identify new piping, valves, balancing cocks, ducts, and equipment in the facility whether concealed within accessible spaces or exposed.

B. Do not label piping or ductwork exposed to view in offices or in public access areas.

C. Identify insulated and uninsulated piping and ductwork.

D. Locate identification so that it is readable by a person standing on the floor for exposed items or at point of access for concealed items.

3.2 PIPING AND DUCTS

A. Provide identification at both sides of partitions and floors, at all branch takeoffs, at connections to equipment and at intermediate intervals not in excess of 50 feet.

B. Secure pipe pressure-sensitive vinyl markers in place with pressure-sensitive tape incorporating direction of flow arrows on both ends of label. At each end make two complete wraps around the pipe with tape so that tape is wrapped back on itself to assure attachment.

C. Identify ducts with stencils indicating system and direction of flow at each access panel, on both sides of all wall penetrations, within sight of valves, and every 25 feet along piping.

3.3 VALVES

A. Identify normally open valves and balancing cocks with valve identification tags. Unless otherwise noted, equipment isolation valves and balancing cocks that are located adjacent to equipment isolated are exempted from this requirement.

B. Identify equipment isolation valves located in ceiling plenums and raised floor plenums unless the equipment isolated is also located in the ceiling plenum or raised floor plenum and is adjacent to isolation valve.

C. Identify normally closed valves with valve identification tags and with a second valve tag reading "NORMALLY CLOSED" in 1/2-inch high letters.

D. Permanently mark, etched or stamped, balancing cock setpoint readings on one and one-half inches diameter brass valve tags attached to balancing cocks with No. 6 bead chain.

3.4 EQUIPMENT

A. Identify equipment, i.e. fans, control panels, etc., with equipment labels mounted in readily accessible and readable location.

B. Mechanically secure labels with a minimum of two screws, bolts, or rivets. Adhesive backing does not provide secure mounting.

3.5 ACCESS PANEL AND CEILING IDENTIFICATION MARKERS

A. Provide identification markers for accessible tile ceiling areas and on access panels to indicate the location of balancing cocks, valves, volume dampers, fire dampers and other concealed mechanical items that may require service or adjustment.

B. Apply markers to the exposed face of panel or the ceiling tee bar nearest the concealed item.

C. Familiarize the Owner's maintenance personnel with the location and function of the markers during the instruction period.

3.6 COLD PIPING ACCESSORIES

A. Identify all cold water accessories located underneath insulation with identification tags connected to accessory with number 6 bead chain or equivalent strength connection. Unless otherwise noted, all chilled water piping accessory tags are to be visible without removal of insulation.

B. Label piping and ductwork to match existing label and color markers.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 20 07 00 - INSULATION FOR MECHANICAL

A. This Section covers selection and installation of insulation used in the mechanical systems.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog cuts and selections of insulation products and accessory items.

B. Application Schedule: Insulation and thickness schedule indicating the type of product, materials, and thickness proposed for each size or application.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide interior insulation having UL listed composite fire and smoke hazard rating not exceeding:

1. Flame Spread: 25.

2. Smoke Developed: 50.

B. Provide accessories such as adhesives, mastics, cement, tapes, and jackets having the same component rating as listed above.

C. Lagging fabric: 100 percent textured silica yarn or 100 percent cotton fabric, 8- ounce per square yard, with or without pre-applied rewettable adhesive finish. Fattal's Thermocanvas, Zetex 300, or equal.

D. Thermal Insulation Coatings: Washable, abrasion resistant coating for thermal insulation. Minimum continuous service rating of 180 degrees F. Maximum dry basis VOC level of 80 grams per liter. Used to adhere lagging fabric without pre-applied rewettable adhesive finish to pipe and duct insulation. Foster #30-36 Sealfas, MEI, or equal.

E. Insulating cements: Mineral fiber base with maximum 0.90 (BTU-inch)/(square foot-hour-Fahrenheit) conductivity at 200 degrees F mean temperature.

F. Vapor barrier coatings: Water based, fire resistive, flexible, maximum 0.08 perm water vapor permeability. Foster #30-80, MEI, or equal.

G. Preformed plastic insulation covers and inserts: PVC with fiberglass inserts provided by cover manufacturer. Johns-Manville Zest2.2on, Fuller Speedline, Proto, or equal.

2.2 INTERIOR, ABOVE GRADE, PIPING SYSTEM INSULATION

A. Fiberglass preformed by the manufacturer specifically for the size pipe or tubing on which it is to be installed unless otherwise indicated. Owens/Corning Fiberglass 25 ASJ, Johns-Manville Micro-Lok 650 with AP-T self-sealing jacket, Knauf ASJ, or equal.

B. Continuous service rating: 500 degrees F minimum.

C. Provide with vapor barrier jacket with maximum water vapor permeability of 0.02 perm and minimum beach puncture resistance rating of 50 units and a white kraft paper facing.

D. Conductivity: 0.28 (BTU-inch)/(square foot-hour-Fahrenheit) maximum at 100 degrees F mean temperature.

2.3 SUPPLY AIR DUCT INSULATION

A. Insulation:

1. Concealed installations: Johns-Manville R-Series Microlite/FSK, Knauf Duct Wrap/FSK, Owens/Corning Faced Duct Wrap/FRK, or equal.

2. Exposed rectangular duct installations: Johns-Manville 800-Series Spin-Glas/AP, Owens/Corning 700-Series/ASJ, Knauf Insulation Board/ASJ, or equal.

3. Exposed round duct installations: Johns-Manville Pipe and Tank Insulation with AP Jacket, Owens-Corning Pipe Wrap/ASJ, or equal.

B. Provide with vapor barrier jacket with a maximum water vapor permeability of 0.02 perms. In concealed areas, the jacket shall have a minimum beach puncture resistance rating of 25 units. In exposed areas, including mechanical rooms, the jacket shall have a minimum beach puncture resistance rating of 50 and have a white kraft paper facing.

C. Conductivity: 0.30 (BTU-inch)/ (square foot-hour-Fahrenheit) maximum at 100 degrees F mean temperature.

D. Continuous service rating: 250 degrees F maximum.

E. Provide pressure sensitive tape used to seal seams constructed from same material as vapor barrier jacket.

PART 3 EXECUTION

3.1 GENERAL

A. Provide insulation for new piping for the systems indicated below unless otherwise indicated.

B. Replace existing insulation that is removed to accomplish Work with new insulation as specified in Part 2 of this Section or to match existing if not specified. Match existing thickness unless otherwise indicated.

C. Surface Preparation: Prior to insulation installation, clean and dry exterior surfaces of pipe and ductwork.

D. Patch insulation on existing pipe and ductwork mains at removed branches. Match existing insulation and finish.

E. Do not cover or obscure manufacturer or field applied identification tags, nameplates, information labels, etc.

F. Seal exposed ends and face of cuts in fiberglass insulation with thermal insulation coating.

3.2 INTERIOR, ABOVE GRADE PIPING SYSTEMS INSULATION, GENERAL

A. Unless otherwise indicated insulate the following piping systems with insulation thickness, additional insulation covering and insulation with a continuous vapor barrier in accordance with ASHRAE 90.1. Details used by this standard are included in the following schedule:

1. Interior domestic cold water, plumbing vent and rain water leader cold piping:

Pipe Size	Insulation Thickness	Lagging Fabric Required	Continuous Vapor Barrier Required
All Sizes	1-inch	Yes	Yes

2. Interior domestic hot water, recirculated domestic hot water, and hot water heating systems with design operating temperatures from 105 degrees F to 140 degrees F hot piping:

Pipe Size	Insulation Thickness	Lagging Fabric Required	Continuous Vapor Barrier Required
<1-1/2 inches	1/2-inch	{1}	No
1-1/2 inches and larger	1-inch	{1}	

3. Hot Water heating systems with design operating temperatures from 141 degrees F to 200 degrees F hot piping:

Pipe Size	Insulation Thickness	Lagging Fabric Required	Continuous Vapor Barrier Required
<4 inches	1-inch	{1}	No
4 inches and larger	1-1/2 inches	{1}	No

B. Where pipes are insulated with two layers, stagger the insulation joints.

C. Where insulation terminates, continue insulation jacketing to cover exposed insulating material and seal to adjoining pipe with vapor barrier coating for cold piping and thermal insulation coating for hot piping.

D. Insulate equipment and accessories with the same thickness as is called for on adjoining piping unless otherwise indicated.

E. Insulate pipefittings to the same thickness as adjoining pipe insulation. Insulate fittings with preformed plastic insulation covers packed full with fitting manufacturer provided fiberglass insulation or with segmented sections of pipe insulation and 1/4-inch coat of insulating cement.

F. Insulate solder and threaded end gate, globe, and ball valve bodies with pipe insulation. Do not insulate valve bonnets or bonnet rings. Fill voids between cutouts and valve body with insulating cement.

G. To provide a continuous vapor barrier on insulated piping systems:

1. With suspended, continuous insulation and hangers / supports, provide calcium silicate insulation segments between the pipes supported and the support. In addition, provide galvanized iron shields between the insulation segments and the supports.

3.3 INTERIOR, ABOVE GRADE PIPING SYSTEMS INSULATION, HOT PIPING

A. Insulate domestic hot water piping in which hot water is being recirculated. Insulation is not required on branch piping to fixtures through which hot water is not being recirculated.

B. Insulate heating water (glycol) supply and return piping. Insulation is not required on concealed branch line piping serving finned tube radiation.

C. Terminate insulation at wall and floor penetrations. Maintain minimum one-inch clearance to combustible construction. At exposed locations, size penetration so that butting insulation to wall trims out penetration.

D. Seal and secure seams and joints to provide a neat and evenly rounded finished surface. It is not necessary to seal penetrations if holes are neatly cut in the insulation and there is a tight fit between the insulation and the penetrating equipment. A complete vapor barrier envelope is not required.

E. At exposed installations, including mechanical spaces, cover piping insulation and ends with lagging fabric, which has been dipped in a thermal insulation coating. Lap lagging fabric over ends of preformed plastic insulation covers. In office areas and in areas exposed to public view, install lagging fabric neatly, with cut rather than torn edges, to give a clean architectural appearance.

F. Secure self-sealing lap on concealed piping insulation with outward clinching staples at a maximum spacing of one foot on center.

G. When pipe insulation is installed around ring, clamp, and clevis type hangers place the seam at the hanger rod and slit the sealing lap to pass around the rod.

H. Notch pipe insulation at trapeze hangers and at angle iron floor and wall supports. Seal insulation exposed to atmosphere with a thermal insulation coating.

3.4 INTERIOR, ABOVE GRADE PIPING SYSTEMS INSULATION, COLD PIPING

A. Domestic cold water: Only that piping serving more than one plumbing fixture. Insulation is not required on cold water branch line piping serving a single fixture, except that piping serving hose bibbs and drinking fountains. Insulate cold water piping serving hose bibbs and drinking fountains full length. Insulation is not required on piping serving only trap primers or on piping from trap primers to floor drains.

B. Continuous through walls, floors, and ceilings unless otherwise indicated.

C. Seal and secure seams, joints, and penetrations in order to provide a neat and evenly rounded finished surface and complete vapor barrier envelope. Fill gaps between insulation and penetrating equipment with insulating cement and coat with vapor barrier coating.

D. Cover piping insulation and ends with lagging fabric, which has been dipped in a thermal insulation coating. Lap lagging fabric over ends of preformed plastic insulation covers. In areas exposed to public view, install lagging fabric neatly, with cut rather than torn edges, to give a clean architectural appearance.

E. When pipe insulation is installed around ring, clamp, and clevis type hangers place the seam at the hanger rod and slit the sealing lap to pass around the rod. After installation, seal these slits with a vapor barrier coating. If notching of the insulation is required to accommodate the hanger, fill the notches with insulating cement and vapor barrier coating.

F. When trapeze hangers and angle iron wall or floor supports are used on piping systems place the pipes supported in direct contact with the hanger. Notch fiberglass insulation at these hangers and supports. Fill the notches with insulating cement and vapor barrier coating.

G. Insulate control valves and isolation valves with an oversized section of insulation. The inside diameter shall equal the outside diameter of the adjoining pipe insulation. Fill any voids between insulation sections with insulating cement and vapor barrier coating to provide a continuous vapor barrier.

H. Where inline piping equipment are covered by insulation and cannot be identified by an exposed item such as a valve handle or pressure taps, install a chain as indicated in Section 20 05 53 “Identification for Mechanical” for a connection of a tag outside the insulation. Seal chain where it penetrates the vapor barrier.

3.5 SUPPLY AIR DUCT INSULATION

A. Insulate only that supply air ductwork indicated on the Drawings or elsewhere in these Specifications to be insulated.

B. Adhere insulation to ducts with noncombustible adhesive in accordance with manufacturer's recommendations for 50 percent coverage.

C. Seal and secure seams, joints, and penetrations in order to provide a neat and evenly rounded finished surface. A complete vapor barrier envelope is not required.

D. Where ducts are insulated with two layers, stagger the insulation joints.

E. On rectangular ducts, additionally secure insulation to bottoms and sides over 24 inches across with mechanical fasteners spaced at 12 inches on center and within 3 inches of all edges and corners.

F. Continuous through walls, floors, and ceilings.

G. Clip pins on mechanical fasteners flush at the washer and cover pin and washer with vapor proof pressure sensitive tape.

H. Apply insulation with joints tightly butted and sealed with vapor proof pressure sensitive tape.

I. Seal penetrations with pressure sensitive tape.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

A. This Section covers selection and installation of basic pipe materials and specialties.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and selections for equipment and accessory items.

B. Substantial deviations:

1. Submit to the Contracting Officer Shop Drawings of any proposed substantial deviations in the piping systems for this facility from these documents for review and acceptance. Include four, plus the number required by the Contractor, copies of each Shop Drawing submitted.

2. Any substantial deviations from these documents installed prior to Contracting Officer review and acceptance of submittal may be required by the Contracting Officer to be removed and the indicated system be installed at no additional cost to the Owner.

3. The Contracting Officer is the sole judge of what constitutes a substantial deviation and what is an acceptable alternate technique or method.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide all pipes, fittings, and accessories required for complete functioning installation of all piping systems specified and required under this Division.

B. Miscellaneous items specified and required under this Division are not necessarily indicated on the Drawings.

2.2 DIELECTRIC PIPE PROTECTION

A. Polyvinyl, 20 mil, self-adhesive. Westape, Calpico, 3M, or equal.

B. Dielectric nipples and flanges only. Dielectric unions are specifically not allowed.

2.3 ESCUTCHEONS

A. Chrome plated brass or stainless steel, spring clip. Dearborne Brass Series 5300, Brasscraft, or equal.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION AND APPEARANCE

A. Conceal piping above ceilings or in walls unless otherwise noted. Expose piping in spaces without ceiling or furred-in enclosures.

B. Install piping in truss space in areas with exposed trusses unless otherwise noted.

C. Route piping within the facility vapor retarder and insulation boundary.

D. Ream pipes thoroughly and clean before installation.

E. Flush lines clear of debris, scale and discoloration prior to startup. Clean out all strainers and drip pockets after flushing.

F. Run pipes with proper grade to provide for easy drainage and venting.

G. Support piping to provide an installation that is without sag or droops.

H. Provide pipe supports and offsets, loops or accessories at equipment connections to minimize connection stress caused by normal system warm-up, cool-down and equipment operation.

I. Install parallel runs of non-insulated piping as required to provide a minimum of 6-inch clearance between piping.

J. Install parallel runs of insulated piping as required to provide a minimum of 4-inch clearance between insulation surfaces.

K. Install piping and equipment as required to provide minimum 6 feet 8 inches of headroom in mechanical rooms, piping within 12 inches of the ceiling in other spaces with exposed piping, and as required to not interfere with other items or access to equipment.

L. At piping penetrating wood or metal framing, cut hole with hole saw and center piping in hole so that piping does not contact wood framing. Provide plastic isolation bushings as required to adequately support piping.

M. Provide escutcheons around pipes at finished floor, ceiling or wall penetrations. Slip steel escutcheons onto piping prior to joining pipe. Set steel escutcheons with bead of paintable silicon sealant at perimeter, press tight to wall or floor, and remove excess sealant.

N. Seal, vapor tight, penetrations through building vapor retarders and exterior surfaces resulting from installation of mechanical system components as required to maintain vapor retarder integrity.

1. At vapor retarder pipe penetrations, provide a double splice patch (one on each side of vapor retarder) by cutting a square piece of vapor retarder 12 inches larger on all sides than the pipe. Cut a round hole in the center of the square splice patch smaller than the pipe to form a stretched fit. Force thread the pipe through the splice patch, tape all sides to the vapor retarder, and tape the vapor retarder to the pipe at the penetration.

2. On the interior face of the exterior stud wall, provide solid blocking installed flat at all mechanical vapor retarder penetrations. Blocking shall be a minimum of four inches larger than the penetration. Locate the penetration at the centerline of the blocking.

3.2 FITTINGS, VALVES, AND ACCESSORIES

A. Make changes of direction, branches, and reductions in pipe size with fittings. Bushings are allowed only in non-pressurized tanks and similar equipment.

B. Provide isolation valves in piping adjacent to equipment, including terminal units, and where indicated. Locate valves on system side of unions or flanges.

C. Provide unions or flanges at connections to equipment and control valves to allow maintenance. Locate unions or flanges to allow maintenance without removal of any additional piping other than that between the union or flange and the equipment. Use of dielectric unions is prohibited.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 22 05 23 - GENERAL DUTY VALVES FOR PLUMBING

A. This Section covers the selection and installation of manual valves.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and selections for valves and accessory items.

2. Data showing parts in contact with domestic water are ANSI/NSF 61 certified to current lead free requirements.

PART 2 PRODUCTS

2.1 GENERAL

A. Standardize on one make as much as possible but not to the extent of sacrificing quality listed. Apollo, Grinnell, Milwaukee, Nibco, Stockham, Vogt, or equal.

B. Provide ball valves where indicated and, at Contractor's option, in lieu of gate valves for domestic water systems in piping two inch and less in size. All valves, two inches and smaller, shall be of same type. Provide ball valves installed in insulated piping systems with extended stems to bring the handle clear of the insulation.

C. ASME Class 125 unless otherwise indicated.

D. Gate and globe valves: Repackable under pressure with valve fully open.

2.2 DOMESTIC WATER SYSTEM VALVES

A. Valves 2 inches and smaller:

1. Isolation valves: ANSI/NSF-61 certified, full port ball valve, two piece, bronze body with brass internals, chrome plated or stainless steel ball, reinforced Teflon seats and seals, non-blowout stem. Nibco S-585-66-LF/T585-66-LF or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide isolation valves in piping adjacent to equipment and where indicated. Locate valves on system side of unions or flanges.

B. Do not install valve stems below horizontal.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 22 11 16 - DOMESTIC WATER PIPING

A. This Section covers selection, installation, testing, and sterilization of domestic water systems.

1.2 SUBMITTALS

A. Manufacturer's Data, catalog cuts and selections of pipe and fittings are not required unless otherwise indicated.

B. Submit certification documentation showing that pipe and fittings in contact with domestic water are ANSI/NSF 61 rated to current lead free requirements.

PART 2 PRODUCTS

2.1 PIPE, FITTINGS, AND JOINTS

A. At minor modifications to existing piping: Match existing.

B. Interior, above ground, three inches and smaller:

1. ANSI/NSF-61 certified type L hard copper tubing with wrought copper solder fittings with lead free solder.

2. 1/2-inch, 3/4-inch, and 1-inch branch piping may be connected to copper run piping using mechanically formed tee connections when run piping is minimum 1-inch, 1-1/2 inches, and 2 inches respectively. 1/2-inch branch piping may only be used to connect a single lavatory or drinking fountain.

PART 3 EXECUTION

3.1 INSTALLATION

A. Prior to performing Work on the existing domestic water system, isolate that portion of system requiring renovation from the rest of the facility's domestic water system. Do not reconnect the isolated portion of the domestic water system to the existing system until sterilization and testing are complete.

3.2 TESTING

A. Test minor modifications to existing system by returning system to normal operating conditions and visually inspect new joints for leaks.

B. Firmly tap soldered fittings with a leather or rubber mallet during the pressure test to demonstrate soundness of soldered joints.

3.3 STERILIZATION

A. Flush piping clear of debris or discoloration prior to sterilization.

B. Prior to connection of the isolated portion of the domestic water system to the existing system thoroughly sterilize new and isolated existing portions of the domestic water system with sodium hypochlorite mixed in solution with water as required to achieve not less than 50 parts per million of available chlorine for a minimum of 24 hours. Take all precautions required to avoid introduction of foreign material into the non-isolated portion of the existing domestic water system. If foreign materials are introduced, sterilize the entire existing domestic water system.

C. Introduce the sterilizing solution into the system in a manner that will cause all parts of the system to come into contact with the solution. Operate all valves at least twice during the contact period.

D. After sterilization, flush the solution from the system with clean water until the residual chlorine content is less than 0.2 PPM throughout the system. During the flushing period, open and close all valves several times.

E. 24 hours after flushing the system, sample the water at one lavatory in each bathroom, at the breakroom and submit samples to an independent testing laboratory for bacteriological testing. Submit certificate of conformance with bacteriological quantity standards, by State of Alaska, Department of Environmental Conservation Drinking Water Regulations (18AAC80), to the Contracting Officer.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 22 11 19 - DOMESTIC WATER SPECIALTIES

A. This Section covers selection and installation of domestic water specialties.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and selections for equipment and accessory items.

B. Submit data showing that specialties and accessories in contact with domestic water are ANSI/NSF 61 certified to current lead free requirements.

PART 2 PRODUCTS

2.1 SPECIALTIES

2.2 HOSE BIBBS

A. HB-1 : Non-freeze, box type, recessed, wall hydrant with concealed hose connection. 3/4-inch inlet. Vacuum breaker. "T" handle key operated. Chrome plated face and bronze casing. J. R. Smith 5509 QT or equal.

2.3 DIELECTRIC NIPPLES

A. Nipples specifically designed to dielectrically isolate dissimilar metal piping systems. Epco, Capitol, or equal.

PART 3 EXECUTION

3.1 SPECIALTIES

A. Provide fixture supply tubes, fixture stops, and fixture traps, tailpieces, and trap arms at all fixtures requiring same.

B. Install traps with no more than one slip or compression fitting between trap and rough-in.

C. Provide escutcheons over all fixture supply and trap tailpiece wall penetrations. Inside cabinet escutcheons may be primed and painted steel instead of chrome plated.

D. Provide dielectric nipples or flanges with dielectric gaskets at flange faces, bolt heads, and nut faces at connections of dissimilar piping materials in the domestic water system including connections

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

A. This Section covers the selection, installation, and testing of waste piping systems.

1.2 SUBMITTALS

A. Manufacturer's Data, catalog cuts and selections of pipe and fittings are not required.

B. Application Schedule: Pipe and fittings schedule indicating the type of product and materials, proposed for each size or application.

PART 2 PRODUCTS

2.1 WASTE AND VENT PIPING

A. At minor modifications to existing piping: Match existing.

B. Above ground:

1. Service weight cast iron soil pipe and fittings. "No hub" pipe and fittings with compression type couplings.

2. Copper DWV pipe and fittings with lead free solder.

C. Underground within the building: Service weight cast iron soil pipe and fittings. Bell and spigot pipe and fittings with double seal compression joints or "no-hub" pipe and fittings with heavy duty compression type couplings. Provide continuous machine applied corrosion protective coating. Galvanizing is not acceptable.

PART 3 EXECUTION

3.1 INSTALLATION

A. Pitch drainage piping down 1/4-inch per foot in direction of flow unless otherwise indicated.

B. Provide cleanouts where indicated, at the base of every stack, every 75 feet along buried interior runs, at every 200 feet along exterior runs, for each aggregate change of direction greater than 135 degrees, and where otherwise required by code. Provide access panels or grade cover boxes where required and as indicated.

C. Piping passing through concrete or cinder walls and floors shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from the lime and acid of concrete. Minimum wall thickness of material shall be 0.025-inch and shall allow for movement including expansion and contraction of piping.

D. Provide a four-inch layer of sand or pea gravel bedding below buried piping.

3.2 TESTING

A. Report any leaks in the existing system to the Contracting Officer. At the option of the Contracting Officer, he will issue a Contract Amendment to repair leaks or he will have Government maintenance personnel repair the leaks.

B. Testing minor modifications to existing system by returning system to normal operating conditions and visually inspect new joints for leaks.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

A. This Section covers the selection and installation of sanitary waste piping equipment, drains, cleanouts and their connection to the domestic waste and vent piping system.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog cuts and selections for equipment and accessory items. Provide a separate complete submittal for each equipment package even though some accessory items may be repeated in several packages.

a. Rough-in data

B. Shop Drawings:

1. Shop Drawing: provide drawings and details for each trench drain installation, including an elevation view, indicating all components making up each trench drain.

2. Contractor fabricated items.

PART 2 PRODUCTS

2.1 CLEANOUTS

A. Vinyl tile floors: Cast iron body and frame with round adjustable scoriated secured cast iron top. Spigot outlet with taper thread, bronze closure plug. J. R. Smith 4223 or equal.

B. Carpeted floors: Cast iron body and frame with round adjustable scoriated secured nickel bronze top. Spigot outlet with taper thread, bronze closer plug. Carpet clamping flange. J. R. Smith 4023-X or equal.

C. Walls: Extra heavy cast iron cleanout tee. Stainless steel shallow cover. Countersunk, taper thread, bronze plug. Vandal proof screws. J. R. Smith 4532-U or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Connect waste to all items requiring same.

B. Refer to the Architectural Drawings for fixture locations and mounting heights.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 22 42 16 - COMMERCIAL LAVATORIES AND SINKS

A. This Section covers the selection and installation of lavatory and sink fixtures, accessories, and their connection to the domestic water and waste piping system.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog cuts and selections for fixtures and accessory items.

a. Provide a separate complete submittal for each fixture type even though some trim items may be repeated in several fixtures.

b. Rough-in data for each fixture.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide IAPMO and ADA complying products and installations.

B. Fixtures: Vitreous china and enameled cast iron fixtures shall be white and stainless steel fixtures natural polished satin finish without discoloration unless otherwise indicated.

C. Rough-in sleeves: Polished chromium plated drawn brass tubing.

2.2 COUNTER MOUNTED SINKS

A. S-1: Double compartment, stainless steel sink (ADA Complying):

1. Counter mounted, self-rimming, double compartment, type 302, 18 gauge, stainless steel sink with rear ledge, under coating, and hand blended highlighted satin finish. 33 by 21 inches overall with 13 by 16 by 8-inch bowls. Elkay Lustertone LR-3321, Just DL-2133-A-GR, or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Connect water and waste to all items requiring same.

B. Refer to the Architectural Drawings for fixture locations and mounting heights.

C. Install fixtures tight to adjacent walls and/or floors. Wall hung fixtures shall not exhibit noticeable deflection when supporting 175 pounds weight on furthermost projection.

D. Provide tight fitting sleeves over all exposed water rough-in nipples.

E. Caulk joints between fixtures and walls with non-hardening silicon caulking. Provide caulking with color matching fixture or wall finish.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 22 42 39 - COMMERCIAL FAUCETS, SUPPLIES, AND TRIM

A. This Section covers the selection and installation of commercial faucets, supplies, trim, accessories, and their connection to the domestic water piping system.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog cuts and selections for fixtures and accessory items.

a. Provide a separate complete submittal for each fixture type even though some trim items may be repeated in several fixtures.

b. Rough-in data for each fixture.

c. Data showing parts in contact with domestic water are ANSI/NSF 61 rated to current lead free requirements.

B. Application Schedule: Faucet, Supplies and Trim schedule indicating the type of product and materials, proposed for each size or application.

PART 2 PRODUCTS

2.1 SUPPLIES AND TRIM

A. Fixture supply tubes – concealed applications: Braided stainless steel outer sheath, inner PVC tubing, ANSI/NSF-61 certified, rated to 125 psi from 40 to 140 degrees F. Brasscraft, Speedway, Eastman, or equal.

B. Fixture stops: Polished chromium plated, brass, compression disc, quarter turn, ANSI/NSF-61 certified, angle stop valves with inlet end connections to suit piping system. Fixed handle operated unless indicated otherwise. Brasscraft, Speedway, Eastman, or equal.

C. Fixture traps, tailpieces, and trap arms: Unless otherwise indicated provide polished, chromium plated, drawn brass tubing not less than 17 gauge. Dearborne Brass 701/704, Brasscraft, Eastman, or equal.

D. Tailpiece, trap, trap arm, stop valves, and supplies covers: ADA complying, molded closed cell vinyl, white, paintable, hidden fasteners. Truebro or equal.

2.2 ACCESSORIES

A. Strainer: Stainless steel strainer basket, neoprene stopper, chrome plated brass, 1-1/2-inch outlet with elbow for offset tailpiece. Elkay LK-35L or equal.

2.3 SINK FAUCETS

A. F-1: Double compartment sink faucets:

1. Single faucet, 2-1/2 inch lever handles with colored indexes, 8-inch swing spout with aerator, renewable seats, chrome plated brass construction, ANSI/NSF-61 certified. Chicago No. 1100 with No. 390 handles, No. L8 swing spout, and No. E3 Softflo aerator, or equal. Moen 8287

2. ADA Complying: Single faucet, 2-1/2 inch lever handles with colored indexes, 8-inch swing spout with aerator, renewable seats, chrome plated brass construction, ANSI/NSF-61 certified. Chicago No. 1100 with No. 390 handles, No. L8 swing spout, and No. E3 Softflo aerator, or equal.

PART 3 EXECUTION

3.1 SPECIALTIES

A. Provide fixture supply tubes, fixture stops, and fixture traps, tailpieces, and trap arms at all fixtures requiring same.

B. For fixtures with exposed supply tubes, provide polished brass. For concealed applications, braided stainless steel supply tubes may be used at Contractor’s option.

C. Install traps with no more than one slip or compression fitting between trap and rough-in.

D. Provide escutcheons over all fixture supply and trap tailpiece wall penetrations. Inside cabinet escutcheons may be primed and painted steel instead of chrome plated.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

A. This Section covers selection and installation of basic pipe materials and specialties.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and selections for equipment and accessory items.

B. Substantial deviations:

1. Submit to the Contracting Officer Shop Drawings of any proposed substantial deviations in the piping systems for this facility from these documents for review and acceptance. Include four, plus the number required by the Contractor, copies of each Shop Drawing submitted.

2. Any substantial deviations from these documents installed prior to Contracting Officer review and acceptance of submittal may be required by the Contracting Officer to be removed and the indicated system be installed at no additional cost to the Owner.

3. The Contracting Officer is the sole judge of what constitutes a substantial deviation and what is an acceptable alternate technique or method.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide all pipes, fittings, and accessories required for complete functioning installation of all piping systems specified and required under this Division.

B. Miscellaneous items specified and required under this Division are not necessarily indicated on the Drawings.

2.2 BALANCING COCKS

A. Combination balancing cock and positive shutoff valve with check valved pressure sensing taps, drain tap, and memory stop. B & G Circuit Setter Plus, Armstrong CBV, Taco Accu-Flow, TA Hydronics, or equal.

B. Teflon seats, EPT checks, EPDM stem "O" ring.

C. 200 psig, 250 degrees F rated.

2.3 FLEXIBLE CONNECTORS

A. Corrugated hose and single braid fabricated from bronze for copper systems. Flexonics Series 200, Metraflex, Twin City, or equal.

B. Rated for 200 psig at 200 degrees F.

C. End fittings to suit installation.

D. Minimum live length is manufacturer's recommended length to allow 3/4-inch offset distance from centerline.

2.4 AIR VENTS

A. Automatic air vents: Non-ferrous, rated for 150 psig operating pressure at 240 degrees F. Taco Hy Vent No 426, Bell and Gossett No. 87, Hoffman, Amtrol, or equal.

B. Manual air vents: "Coin-operated" air vent. B & G No. 4V or equal.

2.5 DIELECTRIC PIPE PROTECTION

A. Polyvinyl, 20 millimeter, self-adhesive. Westape, Calpico, 3M, or equal.

B. Dielectric nipples and flanges only. Dielectric unions are specifically not allowed.

2.6 ESCUTCHEONS

A. Chrome plated brass or stainless steel, spring clip. Dearborne Brass Series 5300, Brasscraft, or equal.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION AND APPEARANCE

A. Conceal piping above ceilings or in walls unless otherwise noted. Expose piping in spaces without ceiling or furred-in enclosures.

B. Install piping in truss space in areas with exposed trusses unless otherwise noted.

C. Route piping within the facility vapor retarder and insulation boundary.

D. Ream pipes thoroughly and clean before installation.

E. Flush lines clear of debris, scale and discoloration prior to startup. Clean out all strainers and drip pockets after flushing.

F. Run pipes with proper grade to provide for easy drainage and venting.

G. Support piping to provide an installation that is without sag or droops.

H. Provide pipe supports and offsets, loops or accessories at equipment connections to minimize connection stress caused by normal system warm-up, cool-down and equipment operation.

I. Install parallel runs of non-insulated piping as required to provide a minimum of six-inch clearance between piping.

J. Install parallel runs of insulated piping as required to provide a minimum of four-inch clearance between insulation surfaces.

K. Install piping and equipment as required to provide minimum 6 feet 8 inches of headroom in mechanical rooms, piping within 12 inches of the ceiling in other spaces with exposed piping, and as required to not interfere with other items or access to equipment.

L. At piping penetrating wood or metal framing, cut hole with hole saw and center piping in hole so that piping does not contact wood framing. Provide plastic isolation bushings as required to adequately support piping.

M. Provide escutcheons around pipes at finished floor, ceiling or wall penetrations. Slip steel escutcheons onto piping prior to joining pipe. Set steel escutcheons with bead of paintable silicon sealant at perimeter, press tight to wall or floor, and remove excess sealant.

N. Seal, vapor tight, penetrations through building vapor retarders and exterior surfaces resulting from installation of mechanical system components as required to maintain vapor retarder integrity.

1. At vapor retarder, pipe penetrations provide a double splice patch (one on each side of vapor retarder) by cutting a square piece of vapor retarder 12 inches larger on all sides than the pipe. Cut a round hole in the center of the square splice patch smaller than the pipe to form a stretched fit. Force thread the pipe through the splice patch, tape all sides to the vapor retarder, and tape the vapor retarder to the pipe at the penetration.

2. On the interior face of the exterior stud wall, provide solid blocking installed flat at all mechanical vapor retarder penetrations. Blocking shall be a minimum of four inches larger than the penetration. Locate the penetration at the centerline of the blocking.

3.2 FITTINGS, VALVES, AND ACCESSORIES

A. Make changes of direction, branches, and reductions in pipe size with fittings. Bushings are allowed only in non-pressurized tanks and similar equipment.

B. Provide isolation valves at pressure gauges.

C. At pressure reducing valves, control valves, and other devices whose size is less than adjoining pipe size, provide reducers immediately adjacent to the device.

D. Provide isolation valves in piping adjacent to equipment, including terminal units, and where indicated. Locate valves on system side of unions or flanges.

E. Provide unions or flanges at connections to equipment and control valves to allow maintenance. Locate unions or flanges to allow maintenance without removal of any additional piping other than that between the union or flange and the equipment. Use of dielectric unions is prohibited.

F. Provide drains valves at all low points in piping systems for drainage unless otherwise indicated.

1. Drains are not required at plumbing fixtures if stop valve forms the low point of the branch.

2. Drains are not required where screwed cap dirt legs are indicated.

3. Provide threaded plug where space is not available to install a drain valve.

G. Provide air vents at high points in closed loop or recirculating piping systems. Install automatic air vents, with isolation valve, throughout the piping systems except where specifically indicated otherwise. Provide manual air vents, with valve, where air vents are required under finned tube radiation enclosures or where space will not allow installation of automatic air vent with isolation valve. Keep automatic air vent isolation valves closed except when purging air from system. Close isolation valves at end of Project.

H. Install balancing cocks with test ports at or above the horizontal position. Permanently mark, etched or stamped, balancing cock setpoint scale readings and balanced flow in GPM on 1-1/2 inches diameter brass valve tags attached to balancing cock with No. 6 bead chain. This tag is in addition to valve identification tag called for elsewhere.

I. Provide flexible connectors where indicated and on all connections to vibration isolated equipment.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 05 23 - GENERAL DUTY VALVES FOR HVAC

A. This Section covers the selection and installation of manual valves.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and selections for valves and accessory items.

PART 2 PRODUCTS

2.1 GENERAL

A. Standardize on one make as much as possible but not to the extent of sacrificing quality listed. Apollo, Grinnell, Milwaukee, Nibco, Stockham, Vogt, or equal.

B. Provide ball valves where indicated and, at Contractor's option, in lieu of gate valves for domestic water and heating systems in piping two-inch and less in size. All valves, two inches and smaller, shall be of same type. Provide ball valves installed in insulated piping systems with extended stems to bring the handle clear of the insulation.

C. ASME Class 125 unless otherwise indicated.

D. Gate and globe valves: Repackable under pressure with valve fully open.

2.2 HYDRONIC STEAM SYSTEM VALVES

A. Valves three inches and smaller:

1. Isolation valves:

a. Gate valves: Rising stem, union bonnet, solid wedge disc. Bronze body, bonnet, stem, and disc. Malleable iron hand wheel. Teflon or graphite impregnated fiber packing. Nibco S-134/T-134 or equal.

b. Ball valves: Full port, two piece, bronze body with brass internals, chrome plated or stainless steel ball, reinforced Teflon seats and seals, non-blowout stem. Nibco S585-70/T585-70 or equal.

c. Automatic air vent, pressure gauge, pressure test port isolation valves, and finned tube element drain valves: Bronze body ball valve, Teflon seats, vitron O-ring stem seals, chrome plated brass ball, non-blow out stem. For finned tube element drains, provide with screw slot instead of handle. Jomar T-82 Mini or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide isolation valves in piping adjacent to equipment, including terminal units, and where indicated. Locate valves on system side of unions or flanges.

B. Do not install valve stems below horizontal.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

A. This Section covers balancing and adjusting of mechanical systems.

1.2 SUBMITTALS

A. Balancer Qualifications and Balancing Plan:

1. Name and address of balancing subcontractor.

2. Balancing subcontractor's certificates, qualifications, and experience in balancing mechanical systems, located in Alaska, of comparable type and size to those associated with this Project.

3. Copies of standard data report forms proposed for use on this Project.

4. Project specific plan/procedures for balancing of mechanical systems.

1.3 QUALITY ASSURANCE

A. The balancing subcontractor shall be a firm, independent of the General Contractor or any other subcontractor, specializing in balancing mechanical systems, with at least five years' experience in balancing mechanical systems, located in Alaska, of comparable type and size to those associated with this Project.

B. Comply with the applicable procedures and standards outlined in one of the following publications:

1. "National Standards for Total Systems Balance" 2002 by the Associated Air Balance Council.

2. "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," dated January 2005, by the National Environmental Balancing Bureau.

C. Instruments used in the balancing procedure must have been calibrated within a period of six months, or as otherwise recommended by the equipment manufacturer, and checked for accuracy prior to start of Work. Make maintenance and calibration records for all equipment available on request for examination by the Contracting Officer.

PART 2 PRODUCTS

2.1 BALANCING REPORTS

A. Bind, tab by system, number pages, and include a table of contents at the beginning of the report.

B. Label the front cover and end panel. Label to include Project title, Project number, date, and facility name.

C. Include a cover sheet containing the following information:

1. Project title, Project number, facility name, Contractor, and date.

2. Name and address of balancing agency performing Work.

3. Signature and seal of responsible member of balancing agency.

D. Provide list of balancing equipment used on this Project with date of last calibration indicated.

E. Summarize Work observed that does not conform to the Contract Documents and Work that does not allow the system to be balanced in accordance with the Contract Documents. Include opinions on why Work does not allow the system to be so balanced, collect data to support those opinions, and recommendations for corrective action that would allow the system to be so balanced.

F. Compile data on standard report forms submitted and accepted.

1. Identify equipment by the same symbol or number used on Contract Drawings.

2. Note Work observed that does not conform to the Contract Documents and installations that do not allow the system to be balanced in accordance with the Contract Documents on the report form.

2.2 REPORT DATA REQUIRED

A. Balance valves:

1. Valve no., terminal unit served, location, and size.

2. Specified flow (GPM).

3. Operating setpoint.

4. Operating flow (GPM).

5. Operating pressure drop (FT H2O).

B. Hydronic Coils:

1. Tag No., location, and service.
2. Face Area.
3. Specified capacity (CFM).
4. Actual capacity (CFM).
5. Specified flow (GPM).
6. Operating flow (GPM).
7. Operating pressure drop (FT H2O).
8. Entering Water Temperature (degrees F).
9. Leaving Water Temperature (degrees F).
10. Entering Air Temperature (degrees F).
11. Leaving Air Temperature (degrees F).

C. Room air outlets:

1. Tag No. and location.
2. Size and style.
3. Area factor (Ft2).
4. Specified capacity (CFM).
5. Actual face velocity (FPM).
6. Actual capacity (CFM).

D. Variable volume terminal units:

1. Tag No. and location.
2. Size and style.
3. Specified capacity at minimum setting (CFM).
4. Actual capacity at minimum setting (CFM).
5. Specified capacity at maximum setting (CFM).
6. Actual capacity at maximum setting (CFM).

PART 3 EXECUTION

3.1 GENERAL

A. Provide labor, instruments, and materials required to balance and adjust the facility's mechanical systems installed by this Project, including those systems modified as part of this Project, to obtain fully functional and properly operating systems.

B. Notify Contracting Officer in writing at least ten days in advance as to when balancing is scheduled to commence.

C. Prior to starting the balancing procedures verify that systems to be balanced are complete, operational, and that:

1. Filters and strainers are clean.

2. Controls system installation is complete and controlling systems to be balanced in accordance with the Contract Documents.

3. Isolation valves or dampers are full open.

4. All piping and ductwork has been cleaned of construction debris and scale.

D. Assist the Control Contractor in establishment of proper minimum outside air damper settings.

E. Assist the Control Contractor in calibration of variable volume terminal units and in adjustment of variable volume terminal unit minimum and maximum airflow settings. Maximum airflow setpoint is indicated. Minimum airflow setting is 30 percent of maximum.

F. Put all mechanical systems and equipment into full operation and continue the operation of same during each working day of balancing. On systems with variable frequency drives (VFD) set adjustable sheaves so that motor operates between 55 HZ to 63 HZ at call for full speed Coordinate with technician responsible for VFD setup to ensure a maximum speed setting is set to prevent current draw above name plate amperage.

G. Keep informed of any major changes made during construction, and obtain a complete set of As-Built Drawings, computer outputs, etc. before starting balancing.

H. Document Work observed that does not conform to the Contract Documents.

I. When Work does not allow the system to be balanced in accordance with the Contract Documents, collect system performance data that will help in determining why the system cannot be so balanced, offer possible corrective action, and otherwise cooperate with the Contracting Officer.

J. Prior to Substantial Completion Inspection, submit three copies of balancing report for review by the Contracting Officer.

K. Upon request, recheck random selections of up to ten percent of the data recorded in the balancing report in the presence of the Contracting Officer. Rebalance the mechanical systems, prepare, and submit for review a new report if more than twenty percent of the rechecked readings deviate more than ten percent from the recorded reading in the balancing report.

L. Upon acceptance of Work by the Contracting Officer, revise balancing report incorporating revised data, description of corrective measures taken to correct previously identified deficiencies, and other Contracting Officer review comments and deliver four record copies of the final report to the Contracting Officer.

M. Following final acceptance of the balancing report, permanently mark all dampers, valves, and other adjustment devices so that the adjustment can be restored if disturbed at any time.

3.2 HYDRONIC SYSTEMS PROCEDURES

A. Examine hydronic circulating systems to determine that the systems are at the proper pressures and temperatures and that air is removed from the equipment and piping.

B. Adjust balancing cocks to obtain the design flows and mark resulting position on each cock. Record terminal unit served, location, type, size, design flow, actual flow, settings, and pressure drop. Flows shall be within ten percent of indicated design. If sufficient pump capacity is not available to obtain indicated flows, distribute shortfall equally amongst all terminal units.

C. Permanently mark, etched or stamped, balancing cock setpoint scale readings and balanced flow in GPM on one and one-half inch diameter brass valve tags attached to balancing cock with No. 6 bead chain. This tag is in addition to valve identification tag called for elsewhere.

3.3 AIR DISTRIBUTION SYSTEM PROCEDURES

A. Record voltage and amperage draw of each fan motor over 1/10 horsepower.

B. Verify that the air handling equipment performs as specified. Adjust variable type pulleys, volume and control dampers. Provide required exchanges of pulleys, drives, belts and add dampers where required. Record sizes of final belts and drives.

C. Record required data for all fans over 100 CFM capacity. Measure flow by duct traverse at discharge duct or filter bank. Plot operating point on manufacturer's curve and include with report.

D. Measure and record operating capacity by duct traverse on all supply branch ducts handling more than 4,000 CFM.

E. Adjust dampers, diffusers, registers, grilles, and fan speed to distribute the design flow within plus ten percent to minus ten percent of the indicated flow in the proper pattern. At least one volume damper in the system shall be one hundred percent open. Adjusting fan capacity by closing volume dampers is not acceptable.

1. Variable Air Volume systems:

a. At completion of terminal unit balancing, record VFD speed with all boxes flowing at design flow (maximum box setting), and measure clean filter pressure drop across each filter bank at maximum box flow rate. Simulate dirty filter pressure drop of double the clean filter pressure drop at each installed filter. Record air handler CFM and static at that condition. Plot on curve.

b. Record fan speed and clean filter pressure drop with terminal units at minimum box airflow.

c. Record fan CFM and static pressure at fan forced to 100 percent speed on VFD with all boxes calling for maximum cooling.

F. Provide instrument test hole fittings in ductwork at locations where insertion of balancing devices into duct work is required.

G. Seal all holes in ductwork used for insertion of balancing devices with plastic or metal clip seals specifically manufactured for that purpose. Sealing holes with silicon sealant or duct tape is specifically not permitted.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 21 13 - HYDRONIC PIPING

A. This Section covers selection, installation, and testing of hydronic heating piping systems and accessories.

1.2 SUBMITTALS

A. Manufacturer's data, catalog cuts of pipe and fittings are not required.

1. Catalog cuts and selections for equipment and accessory items.

B. Application Schedule: Submit pipe and fittings material schedule indicating the type of products, piping, and fittings proposed for each size or application.

PART 2 PRODUCTS

2.1 PIPE AND FITTINGS FOR ABOVE GRADE HYDRONIC HEATING SYSTEM

A. 2 inches and smaller:

1. Type L hard copper tubing with wrought copper solder fittings with lead free solder.

2. 3/4-inch and 1-inch branch piping may be connected to copper run piping using mechanically formed tee connections when run piping is minimum 1-1/2 inches and 2 inches respectively.

2.2 HEATING SYSTEM FLUID

A. Match existing.

B. Glycol and corrosion inhibitors shall be packaged by a single manufacturer.

2.3 HEATING SYSTEM CHEMICAL CLEANING COMPOUND

A. 1 percent-2 percent Tri-Sodium Phosphate and water solution or equal. Approximately 1 pound per 50 gallons.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Install piping level or slightly sloped up in direction of flow.

B. Provide air vents with isolation at all high points and drain valves at all low points.

C. Drain existing system as required to accommodate new work. Check existing glycol concentration and type.

D. Save existing heating system fluid for use in refilling system.

3.2 TESTING

A. Hydrostatically test existing system at 100 psig for 1 hour with no noticeable pressure drop or water leaks.

B. Report any leaks in the existing system to the Contracting Officer.

C. Testing minor modifications to existing system by returning system to normal operating conditions and visually inspect new joints for leaks.

D. Firmly tap soldered fittings with a leather or rubber mallet during the pressure test to demonstrate soundness of soldered joints.

3.3 CLEANING

A. Drain system and refill and clean system with building domestic water treated with chemical cleaning compound using manufacturer's recommended concentrations.

B. Clean system by maintaining system temperature at 140 degrees F, operating all pumps with all control valves positioned to full heating, for a period of 8 hours. At Contractor's option room temperature water may be used but circulation time shall be increased to 24 hours.

C. Flush and drain the system with all strainers cleaned at least twice.

3.4 FILLING

A. Refill system with saved heating system fluid utilizing existing glycol mixing tank and remove air from system. Bring glycol mixing tank to 75 percent full of heating system fluid. Provide additional heating system fluid as required. Match existing glycol type and concentration.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 31 13 - HVAC DUCTS AND CASINGS

A. This Section covers fabrication and installation of air ducts and plenums.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and selections for equipment and accessory items.

B. Shop Drawings: Provide drawing with construction details for proposed special fabrications or deviations from SMACNA or work indicated.

C. Shop Drawings: Substantial deviations:

1. Submit to the Contracting Officer Shop Drawings for any proposed substantial deviations in the duct systems for this facility from these documents for review and acceptance. The submittal shall include one reproducible sheet of each Drawing or seven copies of each non-reproducible sheet submitted.

2. Any substantial deviations from these documents installed prior to Contracting Officer review and acceptance of Shop Drawings may be required by the Contracting Officer to be removed and the indicated system be installed at no additional cost to the Owner.

3. The Contracting Officer is the sole judge of what constitutes a substantial deviation and what is an acceptable alternate technique or method.

PART 2 PRODUCTS

2.1 MATERIALS

A. Galvanized steel, stainless steel, or aluminum sheets conforming to SMACNA HVAC Duct Construction Standards, 2005 Edition. Ducts shown are galvanized steel except where indicated (AL) which shall be aluminum or (SS) which shall be stainless steel. All indicated dimensions are inches.

B. Duct sealant:

1. UL listed, Class 1. Water based, vinyl acrylic suitable for use with low, medium, or high-pressure duct system. Hardcast Iron Grip IG-601, Duro-Dyne DSW, Ductmate Proseal, United McGill Duct Sealer, or equal.

2. Service temperature limits: 0 degrees F to 200 degrees F.

3. Minimum solids content: 60 percent by weight.

2.2 FABRICATION

A. In accordance with SMACNA HVAC Duct Construction Standards, 2005 Edition.

B. Fabricate all ductwork in accordance with SMACNA requirements for two-inch w.g. pressure class unless otherwise indicated with minimum 26-gauge sheet metal.

C. For variable air volume systems, fabricate ductwork from fan outlet to variable air volume terminal box inlets in accordance with SMACNA requirements for 3-inch w.g. pressure class unless otherwise indicated with minimum 26-gauge sheet metal.

D. Fabricate ducts straight and smooth on the inside, with neatly finished joints.

E. At Contractor's option, transverse duct joints may be made with ductmate system companion angles.

F. Bellmouth fittings: Spun with radius transition. Inlet 1/3 larger than outlet minimum. United Sheet Metal Type B-1, SEMCO, or equal.

PART 3 EXECUTION

3.1 DUCT SIZES

A. Duct sizes shown on the Drawings are sheet metal sizes.

B. Requirement for duct lining is indicated elsewhere or on the Drawings by (-"x") where x is the thickness of the lining.

C. Requirement for insulation is indicated elsewhere or on the Drawings by (+"x") where x is the thickness of the insulation.

3.2 INSTALLATION

A. In accordance with SMACNA HVAC Duct Construction Standards, 2005 Edition.

B. Conceal ductwork above ceilings unless otherwise indicated.

C. Support ducts independently from the overhead structure by means of hangers in accordance with SMACNA.

D. Install ductwork and equipment as required to provide minimum 6 feet 8 inches headroom in mechanical rooms, ductwork as high as possible, unless otherwise indicated, in other spaces with exposed ductwork, and as required to not interfere with other items or access to equipment.

E. Provide flexible duct connectors, with 3 inches to 6 inches active length, at all externally vibration isolated fan inlet and outlet connections.

F. Install ductwork and accessories to provide a system free from buckling, warping, vibration or breathing.

G. Do not support other items, pipe, conduit, ceilings, etc., from duct supports.

H. Brace ductwork in accordance with Section 20 05 48 “Seismic Controls for Mechanical.”

I. Seal all ductwork in accordance with SMACNA. Unless otherwise noted, apply seal class "C" to all ductwork in 2 inches w.g. and under construction classes. Clean ducts at joints in accordance with duct sealant manufacturer's recommendations.

J. Mechanically fasten joints with sheet metal screws.

K. Provide access to dampers, motors, other concealed operable items, coils, and items requiring periodic inspection, maintenance, or replacement through maximum practical size access doors.

L. Exposed ductwork has been sized and routed to provide a neat, clean architectural appearance. Exposed ductwork shall exhibit the appearance of carefully crafted workmanship. Final ductwork finish covered under Division 9.

M. At exposed duct penetrations of walls and ceilings, trim penetration with 16 gauge sheet metal frame with mitered corners to trim out opening. Fasten to duct, not wall. Prime and paint to match wall.

N. At insulated ductwork, provide frames for access doors with depth equal to depth of insulation so that insulation can butt to frame.

O. For variable air volume systems, provide low-loss tee branch take-off fittings in high speed ductwork. Other fittings with equal pressure drop are allowed at Contractor’s option.

P. Seal, vapor tight, penetrations through building vapor retarders, including penetrations of computer area vapor retarders, and exterior surfaces resulting from installation of mechanical system components as required to maintain vapor retarder integrity.

1. At vapor retarder, duct penetrations provide a double splice patch (one on each side of vapor retarder) by cutting a square piece of vapor retarder 12 inches larger on all sides than the duct. Cut a hole in the center of the square splice patch smaller than the duct to form a stretched fit. Force thread the duct through the splice patch, tape all sides to the vapor retarder, and tape the vapor retarder to the duct at the penetration.

Q. Maintain duct cleanliness in accordance with SMACNA guidelines to the Basic Level. In addition, seal openings in supply air and any riser ductwork air tight with four mil polyethylene sheeting and duct tape from time of original installation until final connections are made.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 33 11 - AIR DUCT ACCESSORIES

A. This Section covers selection and installation of duct accessories.

1.2 SUBMITTALS

A. Manufacture Data:

1. Catalog selection for equipment and accessory items.

B. Shop Drawings: Provide drawings with construction details for sheet metal fabrication work indicated in contract documents.

PART 2 PRODUCTS

2.1 GENERAL

A. Construct accessories installed in galvanized ductwork as indicated in the following paragraphs.

B. Construct accessories installed in stainless steel ductwork from stainless steel with features indicated in the following paragraphs.

2.2 FLEXIBLE CONNECTIONS

A. Vibration isolated equipment duct connections to non-insulated ductwork.

1. UL listed with three-inch minimum flexible section and 24 gauge metal flanges. Durodyne Excelon Metal-Fab or equal.

2. Continuous temperature range: minus 40 degrees F to 180 degrees F.

3. Rated abrasion resistance: 15,000 cycles.

B. Vibration isolated equipment duct connections to insulated ductwork.

1. UL listed with 4 inches minimum flexible section, 24 gauge galvanized metal flanges, double layer fabric, and one-inch thick fiberglass insulation between fabrics. Durodyne Insulflex or equal.

2. Continuous temperature range: minus 40 degrees F to 180 degrees F.

3. Rated abrasion resistance: 500 cycles.

2.3 TURNING VANES

A. Standard:

1. 24 gauge galvanized, four inches radius airfoil shaped vanes and 24 gauge galvanized rails.

2. 24 gauge galvanized, two inches radius, single vanes and 24 gauge rails may be used on ductwork whose height or width is 12 inches or less.

2.4 DUCT ACCESS DOORS

A. Fabricated per SMACNA and sized for use or as indicated. Minimum 12 inches by 12 inches size where duct size permits. Cesco HAD, Ruskin ADH, Duro-Dyne IAD, or equal.

B. Insulated or acoustically lined to match ductwork.

C. Gasketed, hinged, and cam latch operated. Double latch on doors 18 inches high and larger. Sheet metal screwed in place access panels are not permitted.

2.5 SPIN-IN FITTINGS

A. Constructed from galvanized sheet metal and spring-loaded retractable damper with position locking regulator. Royal No. 702 or equal.

2.6 SHEET METAL PLENUM WALL ACCESS DOORS AND HARDWARE

A. Doors: Constructed in accordance with SMACNA HVAC Duct Construction Standards, 1985 Edition, Figure 7-2. Insulation is not required. Shop built or manufactured units are acceptable.

B. Hinges: Heavy-duty stainless steel full surface ball bearing or full-length piano hinges.

C. Door locks: Stainless steel dual acting lever action with 1/2 inch shaft and inside release handle.

D. Gasketing: Continuous self-adhesive P.V.C. foam or neoprene.

E. Inspection windows: Constructed of plexiglass with a metal frame bolted and gasketed to the casing. Provide in access doors opening into plenums containing fans to view operation of fan wheel, motor, and belts.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

A. All duct accessories shall provide intended function without rattles, sags, vibration or whistles.

3.2 FLEXIBLE CONNECTIONS

A. Provide where indicated and in accordance with manufacturer's and SMACNA recommendations.

3.3 TURNING VANES

A. Provide with vane leading and trailing edges parallel to adjacent duct sides.

B. Provide turning vanes at all mitered elbows in supply, return, and exhaust air ductwork whether or not turning vanes are specifically indicated on the Drawing.

C. Do not install turning vanes in mitered elbows in transfer air boots unless specifically indicated otherwise.

D. Install in accordance with manufacturer's or SMACNA recommendations.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 33 13 - DAMPERS

A. This Section covers selection and installation of dampers.

1.2 SUBMITTALS

A. Manufacture Data:

1. Catalog selection for equipment and accessory items.

B. Shop Drawings: Provide drawings with construction details for sheet metal fabrication work indicated in contract documents.

PART 2 PRODUCTS

2.1 GENERAL

A. Construct accessories installed in galvanized ductwork as indicated in the following paragraphs.

B. Construct accessories installed in stainless steel ductwork from stainless steel with features indicated in the following paragraphs.

2.2 NON-MOTORIZED DAMPERS

A. Volume Control Dampers:

1. Single blade, constructed in accordance with SMACNA.

2. Zinc plated steel, quadrant regulator. Duro-Dyne KS-385/385L or equal.

3. Provide elevated regulators on insulated ducts so that insulation is continuous.

2.3 MOTORIZED CONTROL DAMPERS

A. Motorized Control Dampers:

1. General: Provide insulated motorized control dampers where damper is exposed to outside air such as intake, exhaust, or relief dampers.

2. Insulated Motorized Control Dampers:

a. Provide dampers with silicone or equivalent blade edge seals and jamb seals to guarantee maximum leakage rate of eight cfm per square feet at four inches water gauge pressure differential. Tamco 9000 SC, Ruskin TED50XT or equal.

b. Blades of minimum 6063T5 aluminum, thermally broken with expanded polyurethane foam to provide a minimum blade R-value of two, with polycarbonate dual bearings.

c. Extruded 6063T5 aluminum frames, minimum.

d. Minimum assembly R-value of 0.24 when tested in accordance with ASTM C 976-90 and ASTM C 1199-97.

e. Damper widths over 48 inches long shall be constructed of damper modules bolted and coupled together to achieve the desired dimension. Three or more dampers or damper sections to be coupled horizontally only or vertically only. Provide with jackshaft to individual damper modules.

f. Suitable for operation in airstreams at temperatures from minus 70 degrees F. Seals to remain flexible down to minus 70 degrees F.

g. Dampers located in fan coil units or other air handling equipment mixing boxes are to be supplied by the fan manufacturer as an integral part of the unit and are to be parallel blade set to promote mixing in the plenum.

h. Other modulating dampers shall be opposed blade type.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

A. All duct accessories shall provide intended function without rattles, sags, vibration or whistles.

B. Install in accordance with manufacturer's or SMACNA recommendations.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 33 46 - FLEXIBLE DUCTS

A. This Section covers selection and installation of flexible ductwork.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog selection for equipment and accessory items.

PART 2 PRODUCTS

2.1 GENERAL

A. Class I Connector, UL Standard 181.

B. Flex duct diameters indicated are internal diameter.

C. Factory fabricated with an inner sleeve, insulation, and outer vapor barrier jacket. Thermaflex M-KE or equal.

1. Inner sleeve: Acoustically rated CPE bonded to coated spring steel wire helix.

2. Insulation: Fiberglass blanket, R-Value = 4 minimum.

3. Outer vapor barrier jacket: Fiberglass reinforced film laminate with maximum vapor transmission rating of 0.1 US Perms.

4. Rated operating pressure: Minus 1 to plus 6 inches WG, 4 through 12-inch ID, and minus 1/2 to 6 inches WG, 14 through 16 inch ID.

5. Rated operating temperature: Minus 20 degrees F to 250 degrees F.

6. Rated velocity: 4000-fpm minimum.

7. Maximum Surface Burning Characteristics:

a. Flame spread: 25 maximum.

b. Smoke developed: 50 maximum.

PART 3 EXECUTION

3.1 INSTALLATION

A. Maximum length of each run of HVAC flexible duct shall not exceed 6 feet.

B. In accordance with SMACNA HVAC Duct Construction Standards, 2005 Edition.

C. Support flexible ductwork so that it is not supported by ceilings, ceiling support members, piping, equipment, or other ductwork.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 33 53 - ACOUSTICAL LINING

A. This Section covers selection and installation of acoustical lining.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog selection for equipment and accessory items.

PART 2 PRODUCTS

2.1 DUCT LINER

A. Flexible, made from glass fibers bonded with thermosetting resin. Airside protected with acrylic polymer coating. Manville Permacote Linacoustic or equal.

B. Anti Fungal coating passing ASTM C 1338 fungi testing, as well as the more stringent ASTM G 21.

C. Rated for use in airstreams with velocities up to 5,000 fpm and temperatures up to 250 degrees Fahrenheit.

D. Maximum conductance: 0.25 BTU/hour-square foot-Fahrenheit.

E. Minimum noise reduction coefficient for 1-inch thickness: 0.70.

F. Maximum UL 723 flame spread/smoke developed: 25/50.

G. Factory applied edge coating.

PART 3 EXECUTION

3.1 INSTALLATION

A. In conformance with NFPA 90A and 90B Fire Resistant Requirements.

B. In accordance with SMACNA HVAC Duct Construction Standards, 2005 Edition.

C. Apply acoustical lining to ductwork as indicated on the Drawings by W x D (-x") where x is required thickness. Duct dimensions shown on the Drawings are sheet metal sizes and have been increased to accommodate liner thickness.

D. Line elbows and fittings.

E. Apply manufacturer provided coating on shop and field fabrication cuts.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 36 16 - VARIABLE AIR VOLUME UNITS

A. This Section covers selection and installation of variable volume terminal units.

1.2 SUBMITTALS

A. Manufacturer's Data.

1. Catalog Cuts and selections for equipment and accessory items.

a. Materials of Construction.

b. Dimensional diagrams.

c. Wining diagrams.

d. Control Interface Diagrams.

2. Performance and capacity data including:

a. Capacity and pressure drop under specified conditions.

B. Application Schedule: Variable Air Volume Box schedule indicating type, size, flow, and location.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide factory fabricated variable volume terminal units complete with lined casing, volume control damper, pressure independent volume controller. Provide with factory installed secondary fans where indicated. Trane, Titus, or equal.

2.2 CASING

A. Minimum 22 gauge galvanized sheet metal. Interior lined with one inch acoustical lining.

B. Provide with outlet taps indicate. Provide manual volume control damper at each outlet tap.

2.3 VOLUME CONTROL

A. Provide units with damper assemblies for thermostatic volume control capable of full shut-off and constructed to prevent leakage in excess of two percent of rated air quantity at one-inch inlet static pressure.

B. Key damper blades to shaft.

C. Provide nylon fitted damper pivot points.

D. Provide non-integral damper operator and linkage mounted externally on casing. Operator to be of the same manufacturer as the control system.

2.4 FANS

A. Provide internally isolated fan in series with variable air volume system air control valve at fan powered variable volume terminal units.

B. Fan: Forward curved galvanized steel wheel with 18-gauge housing.

C. Motor: Permanent split capacitor type, direct drive, extended lube line, built-in thermal overload. Manually set, electronic, variable speed fan control.

D. Filters: Provide units that have heating coils with filtered return air inlet. Provide Type 1 filters.

E. Control: Coordinate with sequence of operations.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install as indicated and in accordance with manufacturer's recommendations.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 37 13 - DIFFUSERS, REGISTERS, AND GRILLES

A. This Section covers selection and installation of room air distribution devices and outlets.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog Cuts and selections for equipment and accessory items.

B. Shop Drawings: Provide drawings with construction details for sheet metal fabrication work indicated in contract documents.

PART 2 PRODUCTS

2.1 GENERAL

A. Refer to Drawings for size, type, and capacity.

B. Construct other air outlets and frames from steel or aluminum with eggshell white baked enamel finish, and in T-bar ceilings finish to match T-bar, unless otherwise indicated. Clean, phosphatize, and dry all surfaces prior to finishing.

C. Provide air outlets with frames/borders required to make installation compatible with mounting surface.

D. Provide neck adapters as required to adapt supply duct to diffuser.

E. Coordinate light troffer air boots with troffer supplied.

2.2 LOUVERED GRILLE/REGISTER

A. Steel louvers and frame. Single set or double set and adjustable or fixed louvers as indicated. Mount adjustable louvers in friction pivots. Titus 112 Series, Anemostat, Kreuger, or equal.

B. Provide opposed blade volume damper when indicated. All steel construction. Screwdriver operator accessible through face of grille/register.

C. Provide “Heavy Duty Construction” grilles with minimum 14 gauge face bars at 1/2-inch centers and minimum 18 gauge frames.

2.3 SLOT DIFFUSER

A. 26 gauge galvanized steel casing with 3/8-inch thick, 1-1/2-pound density acoustical lining, UL listed and meeting NFPA 90 A requirements. Titius TBD, Krueger PTBSS, Price TBD, or equal.

B. 26 gauge, double thickness, rotatable, non-adjustable vanes.

C. Provide center notch in four foot long diffusers for installation in two foot by two foot exposed T-bar ceilings or when required to accommodate installation of ceiling grid in a two foot by four foot ceiling.

D. Provide complete with side clips for securing diffuser to T-bar grid.

PART 3 EXECUTION

3.1 INSTALLATION

A. Coordinate installation with location indicated on architectural Drawings.

B. Provide edge gaskets and securely fasten all surface mounted flange type diffusers, registers, and grilles to ductwork or ceilings. Draw the air devices tight to the finished surface to prevent leakage and smudging.

C. Provide ceiling trim specially manufactured for the purpose at all locations where slot diffusers are installed in gypsum board or plaster ceilings.

D. Outlet installation shall result in no gaps between outlet face or frame and mounting surface.

E. At lay-in ceilings, support room air outlets from structure above. At Contractor's option, slot diffusers weighing less than 50 pounds may be secured to ceiling grid using side clips provided with diffuser and sheet metal screws.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 81 33 - EXTERIOR COOLING UNITS

A. This Section covers exterior wall cooling units and accessories.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog cuts and selections for equipment and accessory items.

2. Selection with drawings and details indicating dimensions and compliance with capacity/condition requirements indicated.

3. Diagrams showing connection sizes and locations.

4. Fan data indicating capacity.

5. Dimensional diagrams with equipment clearances.

6. Materials of construction.

7. Electrical data.

8. Wiring Diagrams.

9. Control interface diagram.

B. Shop Drawing; Complete piping diagram showing all pipe sizes, offsets, rises, slopes, equipment and accessory items.

1.3 QUALITY ASSURANCE

A. Warranties:

1. Contractor shall complete the compressor warranty card and mail to manufacturer with final acceptance date indicated, as date warranty is to start.

2. Contractor shall furnish all labor, materials, freight, refrigerant, etc., required to perform warranty work at no additional cost to the owner for compressor warranty period.

PART 2 PRODUCTS

2.1 GENERAL

A. Self-contained factory assembled and wired unit designed to be mounted on the outside of an exterior wall of a conditioned space with supply and return air opening going through the wall. Package to include fan, coils, filters, refrigeration system components, condensing unit, economizer unit, automatic temperature control system and panel, electrical panel with integral disconnect switch, piping, and valves. Bard or equal.

B. Provide units easily serviceable through front or side access panels. All wiring connections to be through side of unit.

C. Complete with cabinet and chassis constructed from heavy gauge galvanized steel and designed for easy service access, and external service.

D. Complete with wiring diagram and schematic diagram mounted on a panel of each unit.

2.2 REFRIGERATION SYSTEM

A. The refrigeration circuit includes a liquid line filter drier, an externally equalized expansion valve, and a high-pressure switch.

2.3 AIR DISTRIBUTION SYSTEM

A. Fan: Quiet, direct-drive with double inlet blower.

B. Filter: Average Rated ASHRAE Standard 52-2012 Efficiency: 20 percent with 85 percent arrestance. Maximum Rated Clean Pressure Drop: 0.30-inch W.G. at 500 FPM face velocity. Two inch Farr 30/30 or equal.

C. Economizer: Provide an economizer to allow outside air to be introduced to the space through the evaporator filter when conditions are favorable for economizer cooling. An air damper and an actuator shall be automatically controlled to provide the desired mixed air temperature for cooling.

2.4 COIL

A. Enhanced aluminum fins around mechanically expanded copper tubes.

B. Provide coated, galvanized, steel condensate drain pan.

2.5 CONTROL SYSTEM

A. Provide a hinged cover dual unit control having a two-stage heat/cool thermostat with individual heat/cool setpoints, adjustable interstage differentials, and bimetallic elements. Capable of controlling two individual cooling units. Bard or equal.

B. Provide a controller featuring a solid-state timer with adjustable lead/lag switchover sequence.

C. Provide a controller with Unit lead selector, Unit 1 & 2 power-on LED's, Unit 1 or 2 lead unit LED's, 48 hour program save on loss of power, industry standard connections, and 24 volt power from each unit.

D. Provide a controller with auto sequencing and which displays on-status and operating status parameters.

2.6 COMPRESSOR

A. Compressors shall be serviceable hermetic reciprocating type featuring a suction gas cooled motor, internal centrifugal oil pump, vibration isolating mountings, internal thermal overloads and crankcase heater.

B. Safety controls shall consist of temperature thermostat, high-low pressure cutout switches, and low oil pressure switch.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install as indicated and in accordance with manufacturers' recommendations.

B. Support units from 2-by-6 framed wall modified as required to install unit per manufactures' recommendations.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 26 05 10 – BASIC MATERIALS AND METHODS

A. Provide all Work as shown on the Drawings and in these Specifications for a complete, safe, and functional installation. All Work shall comply with the latest edition of the National Electrical Code (NEC).

B. The Contractor is responsible for providing a complete and operating facility. The intention of the Contract Documents is to include all labor and materials, equipment, and transportation necessary or reasonably inferable as being necessary for the execution of the work. Where minor adjustments of the work are necessary for purposes of fabrication or installation of items or resolution of conflicts between items within the intent of the Contract Documents, the Contractor shall make such adjustments at no added expense to the Owner. Where such adjustments affect functional or aesthetic design of the work, they shall first be submitted to the Owner's Representative for review and approval.

C. Obtain and pay for all permits, plan reviews and inspections required for the Work covered by this Division of the Specifications.

D. Unless otherwise noted, all materials shall be of new manufacture, and installed before expiration of their shelf life, if applicable.

E. Materials and equipment are to be those of major and reputable manufacturers with ability to render competent and thorough service through local and regional organizations capable of expeditiously providing service, parts and assistance.

F. Materials of similar nature, style, function, purpose and/or appearance shall be like products from the standard product line of the same manufacturer.

G. All products shall be listed by Underwriter's Laboratories for their intended use and location in all cases where UL lists such products. Where no product listed by UL for the application is available, provide certification of performance, function and rating from an independent testing agency or laboratory approved by the Owner.

H. The omission of express reference to any parts, supplies, services, or facilities necessary for, or incidental to, a complete installation shall not be construed as a release from furnishing such items.

I. Verification is required of all equipment sizes and locations prior to the ordering or installation of connection materials and disconnecting equipment to ensure that the power connections are of the proper size and type, and in the proper location. Verify all electrical loads (voltage, phase, full load amperes, number and point of connections, minimum circuit ampacity, etc.) for equipment furnished under all divisions of this specification, by reviewing respective shop drawings furnished under each division. Meet with each subcontractor furnishing equipment requiring electrical service and review

electrical characteristics. Report any variances from electrical characteristics noted on the drawings with the Owner before proceeding with rough work. Obtain and review the equipment shop drawings to determine particular final connection requirements before rough-in begins for each equipment item.

J. All materials shall be installed in a neat, orderly, and secure fashion, as required by these Specifications and commonly recognized standards of good workmanship. The norms for execution of the work shall be in conformity with NEC Chapter 3 and the National Electrical Contractors' Association "National Electrical Installation Standards", for which the Owner's judgment shall be final.

K. Electrical equipment shall be installed in spaces that are accessible and in a manner that allows for maintenance and replacement. Entries into spaces shall allow for the passage of equipment. Coordinate the final locations with piping and equipment of other trades to insure proper access for all trades. Coordinate location of concealed equipment, disconnects and boxes with access panels and doors.

L. Furnish and install all fasteners and other hardware necessary for the proper, secure installation of all electrical features.

1.2 DRAWINGS

A. Unless otherwise indicated, drawing symbols conform to the applicable standards of ANSI. The Drawings (or Contract Drawings) rely heavily upon symbolic representation of the features shown, and represent exact details only so far as indicated.

1. The Drawings are, to some extent, diagrammatic and are not intended to show exact details.

2. Dimensions scaled from the Drawings may vary due to tracing tolerances, printing distortion, field conditions, field changes, and other factors. For these reasons, it shall be the Contractor's responsibility to field verify dimensions that pertain to their Work. The Contractor shall make minor relocations where necessary to resolve conflicts or present a uniform appearance. The Drawings show exact location of electrical features only where specifically dimensioned.

3. The Electrical Contractor shall review the Contract Documents of the other trades on the Project, and shall coordinate the installation of electrical features with the Work of all other trades.

4. Provide fixtures, devices, equipment, conduit, conductors and accessories indicated on the Drawings unless it is specifically indicated that the fixture, device, equipment, conduit, conductor, or accessory is existing.

1.3 REPAIR OF EXISTING FEATURES

A. Where existing or previously completed building surfaces or other features must be cut, penetrated or otherwise altered for the installation of electrical features, such work shall be carefully laid out and performed, and any subsequent patching or repairs that it necessitates shall be performed by skilled mechanics of the trades involved.

1.4 PROTECTION AND CLEANING

A. All electrical equipment shall, during the entire duration of construction work, be protected against water, dust, debris, overspray or any other contamination, whether environmental in origin or as a result of construction Work.

B. Clean up all equipment to factory condition. Use touch-up paint where required. All cleaning shall be in accordance with the manufacturer's recommendations.

C. All construction dust, debris, overspray, scrap and surplus materials, etc. resulting from this Work shall be cleared away, leaving the installation in completely clean condition.

1.5 SUBMITTALS

A. Prior to the purchase of any materials or equipment, the Contractor shall submit for acceptance data completely describing all items intended for use in the work. This data shall include the manufacturer and identifying number or nomenclature; the manufacturer's published data as to size, capacity, power requirements and dimensions, shop drawings; and such other information as necessary to properly describe each item. Catalog cuts fulfilling these requirements will be considered appropriate for this application

PART 2 PRODUCTS

2.1 RACEWAYS

A. Minimum size for all raceways shall be 1/2-inch diameter.

B. Raceways shall be of types and characteristics recognized by the NEC.

2.2 CONDUIT AND TUBING

A. Rigid Steel Conduit shall be hot-dip galvanized, Schedule 40 Dimensions with smooth interior; Allied Tube & Conduit, J & L, Triangle, Western Tube & Conduit, Youngstown, or equal.

1. Rigid Steel Conduit shall be made up with threaded fittings only.

B. Electrical Metallic Tubing shall be hot-dip galvanized, with smooth interior; Allied Tube & Conduit, J & L, Triangle, Western Tube & Conduit, Youngstown, or equal.

1. EMT shall be made up with concrete-tight compression fittings. Provide rain-tight compression EMT fittings for exterior locations. Connectors shall have insulated throats.

C. Intermediate Metal Conduit shall be hot-dip galvanized steel, with smooth interior; Allied Tube & Conduit, Cyprus, Western Tube & Conduit, or equal.

1. IMC shall be made up with threaded fittings only.

D. Flexible Metal Conduit ("flex") shall be Greenfield type, made of interlocking galvanized steel armor; Alflex, American Metal, Carol Cable Co., Electri-flex, National Electric, RACO, Thomas & Betts, Triangle, or equal.

E. Flexible Metal Conduit ("flex") shall be Greenfield type, made of interlocking galvanized steel armor, Alflex, American Metal, Carol Cable Co., Electri-flex, National Electric, Thomas & Betts, Triangle, or equal.

F. Liquid-tight Flexible Metal Conduit ("sealtite" flex or "LT flex") shall have a flexible galvanized steel spiral core with a flexible outer jacket of PVC, resistant to water, oil, grease, corrosive agents, and abrasion; Carol, Anaconda, or equal.

1. Fittings for liquid-tight flexible conduit shall be steel or malleable iron of a type incorporating a threaded grounding cone, nylon or plastic compression ring, and a tightening gland, providing a low resistance ground connection. All throats shall be insulated.

2. Exterior or other extreme temperature applications of Liquid Flexible Metal Conduit shall have temperature rating of minus 67 degrees F to plus 220 degrees F, Liquatite “ATLA”, or equal.

3. If used without a separate equipment grounding conductor, liquid-tight flex shall have a continuous copper ground wire integral with its construction, and shall be made up with fittings approved for grounding.

2.3 WIRES AND CABLES

A. Provide wire and cable as shown on the Drawings and further specified herein. All wire and cable shall be of types recognized by the NEC and meeting the specifications of the NEC and ICEA.

B. Conductors:

1. All conductors shall be copper, except as otherwise noted. Conductors No. 10 AWG and smaller shall be solid or stranded. Conductors No. 8 AWG or larger shall be stranded.

C. Insulation Types:

1. Branch circuit conductors shall be 600 volt insulated, and unless otherwise noted on the Drawings, shall have the following insulation types:

   a. Heated indoor spaces - THHN/THWN or XHHW.

   b. In conduit, outdoors or other cold locations (such as attics) - XHHW.

2. Feeder conductors shall have type XHHW insulation.

3. Nylon-jacketed conductors such as types THHN or THWN shall not be used in any location subjected to ambient temperatures below 32 degrees F.

4. Special applications: Conductors in fluorescent fixture wiring channels shall have 90 degrees C insulation rating, types THHN, XHHW, or equal. Conductors in high temperature locations shall have one of the high temperature insulation types suitable for the use and as permitted by the NEC.

D. Metal Clad (MC) Cable

1. Provide metal-clad cable (Type MC) that complies with UL Standard 1569, the NEC, and this Section.

2. Metal-clad cable shall consist of THHN insulated solid copper conductors, a Mylar wrapping around the conductor bundle, and a close fitting aluminum or galvanized steel outer sheath.

3. Provide minimum 12 AWG conductors in Type MC cables.

   a. Provide larger conductor sizes as required to limit branch circuit voltage drop to 3 percent at the full connected load.

   b. Use larger conductor sizes to adjust allowable ampacity if there are more than 3 current-carrying conductors in a cable.

   c. For isolated ground power circuits provide Type MC cables with a separate neutral conductor for each phase conductor; uniquely identify each neutral with a colored stripe on the white insulation corresponding to the phase conductor insulation color.

4. Provide MC cables with the specified conductor color coding.

5. Metal-clad cable manufacturer: AFC Cable Systems Inc., or equal

6. Provide NRTL listed, insulated throat, snap-in steel box connectors for Type MC cables. Manufacturer: O-Z/Gedney ETP “Speed-Lock”.

2.4 OUTLET BOXES

A. Cast boxes with threaded hubs, external mounting brackets or holes, and gasketed covers shall be used in the following locations:

1. Exterior locations.

2. Wet or Damp locations.

B. Exposed interior locations below 8 feet above finished floor, for use with exposed raceway systems, shall be of the threaded-hub cast metal type, with matching cover suitable for the device being installed.

2.5 WIRING DEVICES AND PLATES

A. Switches:

1. Switches shall be premium specification grade, AC quiet type, with screw terminals.

2. Rated 20 amperes at 120 volts for 120 volt circuits.

3. Two-pole, three-way, four-way and other types of switches shall be provided where indicated on the Drawings. Where not otherwise designated, switches shall be single-pole, single-throw.

4. Switch handles shall be ivory, except where pilot-light switches are called for, in which case they shall have a neon lamp mounted in a translucent red handle.

B. Receptacles:

1. Single and duplex receptacles shall be Commercial Specification grade, nylon faced, white color, self-grounding, 120 volt, 20 amp, 3-wire, NEMA 5-20R configuration, with screw terminals.

2. Special purpose receptacles shall be Specification grade, with the NEMA configuration noted on the drawings.

3. Weatherproof covers shall have a full width hinged cover suitable for receptacles installed in wet locations to maintain the integrity of the receptacle when the attachment plug is inserted. Covers shall be constructed of die cast aluminum, for duplex receptacles, drilled for four screw holes for horizontal.

4. GFI receptacles shall be of NEMA 5-20R configuration, tamper and weather resistant rated when required for installation in a wet location, for single-strap mounting, with "test" and "reset" buttons accessible from front. Ground fault trip level shall be 5 mA, and the trip circuitry shall be essentially immune to nuisance tripping due to spurious influences such as RF noise. Feed through terminals shall be provided for protection of downstream outlets.

5. Cover plates for devices in recessed boxes shall be made of satin-finished 430 stainless steel. Cover plates for devices in surface-mounted boxes shall be of pressed or machined metal construction, specifically designed to suit the boxes.

C. Terminals:

1. Wiring devices shall have binding-screw type terminals only. Terminals using spring pressure to secure the wire and make electrical contact are not permitted.

D. Manufacturers:

1. Among the acceptable wiring devices and plates are the products of Arrow-Hart, Bryant, Hubbell, Leviton, P&S, or equal.

E. Dimmers:

1. Dimmers shall be 120/277 volt, single pole, electro-mechanical electronic 0-10VDC LED power supply dimmers, suitable for use with Class 1 or Class 2 wiring. Dimmers shall be rated for a minimum load of 1,200 VA, and provided with standard on/off push button control with slide dimmer, white finish and Radio/TV filter.

2. Dimmers shall be Leviton Cat. No. IP710-LFZ, or equal.

2.6 OVERCURRENT PROTECTION DEVICES

A. Circuit Breakers:

1. Unless otherwise noted, circuit breakers shall be of the molded-case thermal-magnetic type, with the following features:

a. Size, number of poles, and interrupting capacity as shown on the Drawings. Ampere ratings shall be clearly visible, even when the breaker is installed in its appropriate enclosure.

b. Voltage rating to suit the voltage of the system on which they are used.

c. Each breaker pole shall provide both instantaneous and inverse-time tripping, with tripping clearly indicated, and a common-tripping tie to any other poles in the same breaker. Handle-ties are not acceptable for this purpose.

d. Breakers shall be operated by a toggle handle and shall have a quick-make, quick-break, overcenter switching mechanism that includes a trip-free feature so that the contacts cannot be held closed against tripping currents.

e. Circuit breakers shall be labeled or listed by an independent testing laboratory, and shall conform to the latest NEMA Standards and the short-circuit test parameters of NEMA Publication AB 1.

f. Circuit breakers shall not use solid-state components for any function except ground-Fault tripping.

2.7 PANELBOARDS

A. Panelboards shall be of the size and type noted on the drawings. Panelboards shall be provided with a separate equipment ground bus. Provide full height bussing to allow the use of all available branch circuit space. Provide typed circuit directory for new and all existing panelboards; verify existing circuit loads. Provide panelboards complete with bolt on circuit breakers as indicated on the drawings and panelboard schedules. Panelboards for 208Y/120 volt system shall be Square D Type NQ, or equal.

B. Confirm the existing panelboard manufacturer prior to ordering new circuit breakers for the panel. Provide new circuit breakers to match the requirements of the manufacturer of the existing panelboard; breakers shall be sized as indicated on the drawings. Provide a new updated, typed circuit directory for each panelboard that has new work done on it.

2.8 FASTENERS

A. Raceway supports, boxes, and other electrical devices shall be fastened by wood screws or sheet metal screws on wooden surfaces, toggle bolts on hollow masonry units, expansion bolts on concrete or brick, and machine screws or welded threaded studs on steel work. Threaded studs driven by a powder charge and provided with a lock washer, flat washer, and nut(s) are acceptable in lieu of expansion bolts or machine or wood screws.

B. All fasteners shall be provided with flat washers. All fasteners having untapered threads (such as machine screws) shall also be provided with a lock washer under the bolt head or nut, whichever is turned in the process of tightening. Fasteners through resilient materials shall have stop sleeves.

C. All threaded fasteners and associated hardware shall be steel, with a cadmium-plated finish.

D. Bolts shall have Hex or Allen heads. Screws shall have straight-slotted, Phillips, or Allen heads. Screws with square-socket heads.

2.9 GROUNDING

A. All metal raceways, enclosures, other electrical equipment and non-electrical equipment such as tanks and dispenser platforms that may pick up harmful potentials from the electrical system, shall be securely bonded and grounded as required by the NEC and the Drawings.

B. All grounding conductors and bonding jumpers shall be copper, sized according to the NEC or as noted on the Drawings.

C. Provide a green equipment grounding conductor in all feeders and branch circuits. Terminate each end on a suitable bus or lug.

D. Telecommunications Grounding:

1. All telecommunications grounding shall be provided and installed in accordance with the Motorola Standards and Guidelines for Communications Sites, R56.

2. The telecommunications grounding busbar shall be a predrilled copper bus bar provided with standard NEMA bolt hole sizing and spacing, suitable for two-hole lugs. It shall be provided with mounting brackets and insulators. It shall have a minimum thickness of 1/4 inches, a minimum width of 2 inches and a minimum length of 12 inches. It shall be electrotin plated for reduced contact resistance. The grounding bus bar shall be listed.

2.10 INTERIOR LIGHTING

A. Provide luminaires as indicated on the drawings. Provide luminaires complete with lamps of number, type and wattage indicated. Details, shapes and dimensions are indicative of the general type desired, but are not intended to restrict selection to luminaires of a particular manufacturer. Luminaires of similar designs, light distribution and brightness characteristics, and of equal finish and quality may be submitted.

B. Lamps shall have the following features:

1. LED solid state elements shall be inclusive of the fixture and not require periodic replacement. When replacements are required the fixture shall allow the replacement of the solid state lighting elements (LED's), the associated frequency generators, power couplers and other related components required to refresh the fixture.

C. Accessories:

1. Lighting fixtures shall be provided complete with all suspension, trim, mounting, and operating accessories normally considered necessary for a complete, functional, and safe installation, whether specifically called for in the Contract Documents or not.

2.11 OCCUPANCY SENSORS

A. All occupancy sensors shall be equipped with low-voltage leads and an internal Form C relay. Provide with auxiliary relays for multiple circuit switching where shown on the drawings.

1. Type OSA occupancy sensors shall be dual technology ultrasonic and passive infrared devices with all digital technology to continuously analyze the environment and self-adapt to meet specific changes, ceiling mounted, immediate activation, adjustable 8 minute to 32 minute electronic timer upon evacuation, 2,000 square foot coverage in a square room, use with auxiliary power switch packs, 277 volt, 20 amp contacts, off white; Basis of Design Hubbell No. OMNI-DT2000-RP.

2.12 FIRE ALARM SYSTEM

A. Provide fire alarm system modifications, modules, accessories and devices, and extend existing fire alarm circuits to new locations and devices as required to provide a complete and functional fire alarm system as shown on the Drawings and further specified herein. All new work added under this contract shall be compatible with the existing Fire Alarm and Detection System. The entire installation shall conform with the requirements of NFPA Publication No. 72.

B. The existing fire alarm control panel is a Simplex Model 4010 ES fire alarm system.

2.13 TELECOMMUNICATIONS SYSTEM

A. Provide a complete telecommunications network system, consisting of building infrastructure, interior raceways, telecommunications cables, outlets and connections to existing patch panels as shown on the drawings and further specified herein.

B. Provide and conduct all tests as specified herein, requested by the Contracting Officer, or otherwise required to certify, validate and demonstrate the safety, completeness and proper installation of all system components.

C. Install all work in strict accordance with TIA/EIA standards, and with the manufacturer's recommendations.

D. Distribution cables shall be 4 pair, 24 AWG solid, unshielded, plenum rated outer jacket, UL/NEC rated Type CMP, TIA/EIA-568-C Category 6, 100 ohm impedance. Cable shall be provided with an overall jacket with sequential footage markings and a ripcord for easy cable entry. Distribution cables shall be Berk-Tek Lanmark-6 Category 6, Four-Pair Plenum Cable, or similar products by Comscope, Belden or equal.

E. Outlets

1. Faceplates shall be available in single gang arrangement with 2, 4 or 6 module capacities.

2. Faceplates for standard outlets shall be single gang, capacity for a minimum of four ports or modules. Outlets shall mount in a single gang plaster ring in outlet boxes as specified in these specifications. Surface mounted outlets shall mount on a single gang box, unless otherwise required by the indicated configuration.

3. The standard communications outlet shall include 4 communication ports unless otherwise noted in the drawings. The telecommunications ports shall be constructed of high impact rated thermoplastic housing, RJ-45 non-keyed type, 8 position, 8 conductor (8P8C), modular in construction, with reusable insulation displacement terminations, conforming to TIA/EIA-568-C Category 6 requirements, configured and color coded for TIA/EIA-568-C designation T568B wiring.

4. Blank modules shall be provided to fill unused ports in the faceplate. Provide color coded snap-in icon tabs denoting the current media service (e.g. phone, data, video, etc.) with color as chosen by the Owner. Fill all unused openings with blank modules and insert one data tab per utilized port.

5. The outlets and associated components shall be products manufactured by Ortronics, Siemens, Leviton, or equal.

PART 3 EXECUTION

3.1 IDENTIFICATION OF ELECTRICAL EQUIPMENT

A. Panelboards, disconnect switches, push-buttons, selector switches, distribution gear and switches and circuit breakers therein, and the like shall be labeled with laminated plastic labels engraved with white letters on black background. Lettering shall be block style, 1/4-inch tall, except where space limitations, drawing notes, or other requirements in these Specifications dictate otherwise. Labels shall be secured with pop rivets or screws. Adhesive attachment is not acceptable.

B. Terminals on strips shall be numbered with indelible markings on special strips designed for the purpose, and a diagram or typed directory shall be provided in the terminal enclosure to identify the origin, function and destination of each conductor in the enclosure.

C. All receptacle plates shall be labeled with the panel and circuit number for the branch circuit that supplies the receptacle.

D. All conductors in pull or junction boxes or other enclosures shall be permanently and legibly tagged or labeled with panel and circuit numbers or other data which clearly identifies their origin, function and destination.

3.2 RACEWAYS

A. All conductors shall be run in metal raceways as follows, unless otherwise noted on the Drawings.

B. Feeder Raceways - Rigid Steel Conduit (RSC). Electrical Metallic Tubing (EMT) may be used for indoor feeder raceways where not subject to physical damage.

C. Branch Raceways - Unless otherwise shown, raceways concealed in non-concrete walls may be Electrical Metallic Tubing (EMT).

D. The substitution of Intermediate Metal conduit for Rigid Steel Conduit where permitted by the NEC is permitted by this Specification, except RSC and IMC shall not be intermixed in any conduit run unless a pullbox or conduit body is provided between them.

E. Exposed raceways shall be run square with the building lines.

F. Structural members shall not be cut, drilled, or notched for raceways or other electrical features unless specifically accepted by the Engineer.

3.3 WIRING AND CABLES

A. Branch circuit conductors shall be color-coded by factory pigmentation of the insulation. Larger conductors may be color-coded by wrapping the ends with colored tape in all enclosures, except that white and green conductors may never be phase-taped for any use other than neutral and ground, respectively.

B. Conductors No. 6 AWG and smaller shall be color-coded by factory pigmentation of the insulation. Larger conductors may be color-coded by wrapping the ends with colored tape in all enclosures, except that white (or gray) and green conductors may never be phase-taped for any use other than neutral and ground, respectively. Color-coding throughout the entire installation shall be as follows:

Conductor	208Y/120
Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green

3.4 SYSTEM VOLTAGE

A. Branch circuit conductors shall be No. 12 AWG copper, except for the following:

1. On 120 volt, 20 amp circuits over 70 feet (actual measured one-way distance) from panel to the last receptacle or middle of the lighting string (as appropriate), use No. 10 conductors for the entire circuit.

2. Where branch circuit conductor sizes are indicated on the Drawings, they shall take precedence over the foregoing. Where field conditions dictate circuit routings that increase conductor lengths beyond what would be expected from the layout shown on the Drawings, they shall be submitted to the Engineer for acceptance.

B. All conductor connections shall be made up securely with solderless pressure connectors such as setscrew lugs, split-bolts, wirenuts, "wingnuts", or suitable crimp fittings. Live-spring connectors which cannot be tightened to a point where conductor deformation occurs (such as "Scotchloks") are not permitted. Each wirenut-type connector shall not contain more than four conductors, regardless of size.

C. Use compression type connectors for copper wire splices and taps, #6 AWG and larger. Utilize heat shrink tubing of the proper voltage rating for un-insulated conductors and connectors.

D. Thoroughly clean wires before installing lugs and connectors.

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

F. Terminate spare conductors with wire nuts.

G. Where stranded conductors are used, their ends shall be twisted and "tinned" with solder prior to connection, or else terminated with crimp-on connectors (T & B Sta-Kon, or equal), set screw lugs, box lugs, or self-lifting pressure terminals.

H. Flexible cords shall be connected to equipment, fixtures, boxes, or other enclosures only by means of cord-grip bodies or other strain-relief fittings specifically designed for the purpose. NM cable clamps are not permitted for this use.

I. Where conductors or their connectors are to be connected to metal surfaces, the surface shall first be scraped free of any paint, oxide, or other non-conductive substances.

J. Conductors shall be pulled into raceways only by constant-tension pulling methods. Where necessary, wire-pulling lubricants of a type that is not harmful to conductor insulation and will not harden shall be used.

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

L. Neatly train and lace wiring inside boxes, equipment and panelboards.

M. Type MC Cable installation.

1. Install MC cables according to NECA 1 Standard Practices for Good Workmanship in Electrical Construction, NECA 120 Standard for Installing Armor and Metal Clad Cable, the NEC section 330, and requirements in this Section.

2. Route MC cables to meet Project conditions.

3. Use Type MC cables for 15- and 20-ampere branch circuit wiring beyond the first outlet or junction box; however, use conduit for the “homerun” from the first outlet or junction box to the branch circuit panelboard.

4. Use Type MC cables in interior, dry locations where it will be concealed above ceilings, in dry-wall partitions, in equipment enclosures, or below raised floors.

5. Install and support Type MC cables as required in Article 330 of the NEC. Use NRTL listed spring steel MC cable supports or UV resistant plastic tie wraps to support Type MC cables; do not use wire to support Type MC cables.

3.5 LIGHTING

A. Provide support to all fixtures:

1. Fixtures (other than those designed for simple box mounting) that are mounted directly on the building structure shall be supported with fasteners appropriate for the type of construction, in the following configuration. Fluorescent fixtures up to 2 feet by 4 feet shall have four fasteners, one near each corner.

2. Fasteners into wooden members shall be appropriately sized sheet metal or lag screws, penetrating at least 1-1/4 inches into members at least 2 inches thick.

3. Pendant or chain-hung fixtures no more than 8 feet long shall have two such supports, each approximately 1/4 of the fixture length in from each end. End connections shall be an inverted ‘Y’ configuration or other means used to stabilize the fixture to be approximately parallel to the floor in the final installed condition.

B. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt and debris from installed luminaires.

C. For fixtures weighing over 20 pounds provide seismic anchors per FEMA E-74 standard.

3.6 PAINTING

A. Paint all exposed conduit to match surface to which it is attached or crosses. Clean greasy or dirty conduit prior to painting in accordance with paint manufacturer's instructions.

3.7 FIRE ALARM SYSTEM

A. System shall be complete with all equipment, connections, wiring, back boxes and conduit. The system shall be tested, adjusted as required, and left in completed, fully-functional condition.

B. The system shall be tested, adjusted as required, and left in completed, fully-functional condition.

C. The entire fire alarm system shall remain operational whenever the building is wholly occupied by the Owner. No troubles shall be on the system and no Owner occupied part of the building shall be unprotected. During construction periods, when the building is occupied (wholly or partially) by the Contractor only, portions of the fire alarm system may be disconnected, removed, added or modified from the fire alarm system as required.

D. The Fire Alarm System shall be tested to meet the requirements of NFPA Standard 72 acceptance test, and shall be performed by an individual with NICET certification.

3.8 TELECOMMUNICATIONS SYSTEM

A. WIRING AND RACEWAYS

1. Equipment or devices shall have complete cable systems from the equipment or device outlet box to a terminal block or patch panel location. All cables shall be terminated in a modular jack at the outlet port, and left coiled above the rack or future rack location. One separate run per outlet port shall be provided.

2. All wiring shall be continuous from the communications outlet to the rack location. No splices shall be allowed.

3. Wiring in ceilings shall be supported by cable supports specifically designed to support and secure cables above suspended ceiling tiles, or shall be installed in cable tray where indicated on the Drawings. Neatly bundle and tag wiring.

4. Where cables are run exposed in finished areas, where subject to physical damage, or where raceways are indicated on the Drawings, wiring shall be run in metal raceways as specified for power wiring. Conduit fill shall not exceed 40 percent.

5. Maximum distribution cable length for computer outlets shall not exceed 90 meters (295 feet).

6. Wiring in cable trays shall be neatly bundled and tagged with Cable Management Straps.

7. Wiring shall not share raceways or be bundled with other building systems.

8. All cables shall be labeled at each end with the location of the other end.

9. A nylon pull cord shall be pulled into all empty raceways, with a minimum 12-inch tail at each end.

10. Computer distribution cable shall be punched down by approved methods for TIA/EIA 568-C standards for Category 6 wiring and properly terminated at each outlet configured for TIA/EIA 568B wiring.

END OF SECTION

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02 41 19					**Selective Demolition**					
1		1.5.A	SD-01		Proposed Protection Measures					
2		1.5.B	SD-01		Schedule of Selective Demolition					
3		1.5.C	SD-01		Predemolition Photographs or Video					
4		1.5.D	SD-03		Warranties					
5		1.6.A	SD-11		Inventory					
02 80 00					**Hazardous Materials**					
1		1.5.A.4.a	SD-01		Notification of Demolition and Renovation					
2		1.5.A.4.b	SD-01		Written Notification to ADOL					
3		1.5.A.4.c	SD-07		Letter from ADOL Stating Workers are Certified for Asbestos Work					
4		1.5.A.4.d	SD-07		Workers' Current State of Alaska Asbestos Abatement Certificates					
5		1.6.A.1	SD-11		Waste Shipment Records					
6		1.6.A.2	SD-11		Disposal Site Receipts					
7		1.6.A.3	SD-11		Revised EPA Notification Showing Actual Disposal Amounts					
07 13 00					**Sheet Waterproofing**					
1		1.4.A	SD-03	2.2.A	Self-Adhered Modified Bituminous Sheet Membrane					
2		1.4.A	SD-03	2.3.A	Sealant					
07 21 00					**Thermal Insulation**					
1		1.3.A	SD-03	2.2.A	Expanded Polystyrene (EPS) Board Insulation					
2		1.3.A	SD-03	2.3.A	Fiber Glass Bat Insulation					
3		1.3.A	SD-03	2.4.A	Adhesive					
07 42 13					**Metal Wall Panels**					
1		1.3.A	SD-02		Shop Drawings					
07 62 00					**Sheet Metal Flashing and Trim**					
1		1.3.A	SD-02		Shop Drawings					
08 31 00					**Access Doors and Panels**					
1		1.2.A	SD-03	2.1	Wall and Ceiling Mounted Units					
2		1.2.B	SD-08		Manufacturer's Installation Instructions					
09 05 61					**Common Work Results for Flooring Preparation**					

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1		1.3.A	SD-03		Floor Covering and Adhesive Manufacturer's Product Literature					
2		1.3.B	SD-06		Testing Agency's Report					
3		1.3.C	SD-06		Adhesive Bond and Compatibility Test Report					
09 21 16					**Gypsum Board Assemblies**					
1		1.4.A	SD-03	2.1	Gypsum Board Assemblies					
2		1.4.A	SD-03	2.2.B	Non-Loadbearing Framing System Components					
3		1.4.C	SD-03	2.2.C	Partition Head to Structure Connections					
4		1.4.A	SD-03	2.3.B	Gypsum Wallboard					
5		1.4.A	SD-03	2.4.A	Acoustic Insulation					
6		1.4.A	SD-03	2.4.B	Acoustic Sealant					
7		1.4.A	SD-03	2.4.C	Joint Materials					
8		1.4.A	SD-03	2.4.D	High Build Drywall Surfacer					
9		1.4.A	SD-03	2.4.E	Screws for Attachment to Steel Members Less Than 0.03 inch in Thickness					
10		1.4.A	SD-03	2.4.F	Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness					
09 65 00					**Resilient Flooring**					
1		1.4.A	SD-03	2.1	Tile Flooring					
2		1.4.A	SD-03	2.2	Resilient Base					
3		1.4.B	SD-10		Maintenance Data					
09 91 23					**Interior Painting**					
1		1.3.A	SD-03	2.1.A	Paints and Finishes					
2		1.3.A	SD-03	2.1.B	Volatile Organic Compound (VOC) Content					
3		1.3.A	SD-03	2.2.A	Paint I-OP					
4		1.3.A	SD-03	2.2.B	Paint I-OP-MD-DT					
5		1.3.A	SD-03	2.2.C	Paint I-TR-W					
6		1.3.B	SD-04		Samples					
7		1.3.C	SD-10		Maintenance Data					
10 26 01					**Wall and Corner Guards**					
1		1.2.A	SD-03	2.1.A	Wall and Corner Guards					
2		1.2.A	SD-03	2.2.A	Corner Guards - Surface Mounted					
3		1.2.B	SD-08		Manufacturer's Instructions					
10 51 29					**Phenolic Lockers**					
1		1.3.A	SD-03	2.2	Phenolic Lockers					
2		1.3.B	SD-02		Shop Drawings					

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3		1.3.C	SD-04		Samples					
4		1.3.D	SD-08		Manufacturer's Installation Instructions					
12 35 30					**Residential Casework**					
1		1.3.A	SD-03	2.2	Components					
2		1.3.A	SD-03	2.3	Hardware					
3		1.3.B	SD-02		Shop Drawings					
12 36 00					**Countertops**					
1		1.3.A	SD-03	2.1.B	Solid Surfacing Countertops					
2		1.3.A	SD-03	2.2.A	Adhesives					
3		1.3.B	SD-02		Shop Drawings					
4		1.3.C	SD-06		Test Reports					
5		1.3.D	SD-08		Manufacturer's Installation Instructions					
6		1.3.E	SD-10		Maintenance Data					
20 05 29					**Hangers and Supports for Mechanical**					
1		1.2.A	SD-03	2.2.A	Non Insulated Pipe Hangers					
2		1.2.A	SD-03	2.2.B	Insulated Pipe Hangers					
3		1.2.A	SD-03	2.3	Riser Clamps					
4		1.2.A	SD-03	2.4	Hanger Rods					
5		1.2.A	SD-03	2.5	Channel Struts					
6		1.2.A	SD-03	2.6	Steel Structure Attachments					
7		1.2.A	SD-03	2.7	Chair Anchors					
8		1.2.B	SD-01		Application Schedule: Hanger and Support Systems					
9		1.2.C.1	SD-06		Test Reports: Third Party					
10		1.2.C.2	SD-06		Concrete Anchors Special Inspection Form					
11		1.2.D	SD-02		Shop Drawings: Fabricated Items					
20 05 48					**Seismic Controls for Mechanical Deferred Design**					
1		1.2.A	SD-01		Name and Contact of Restraint Designer					
2		1.2.B	SD-03		Factory Seismic Restraint Systems					
3		1.2.C	SD-01		Application Schedule: Seismic Restraint Systems					
4		1.2.D	SD-06		Test Reports and Certificates					
5		1.2.E	SD-01		Plan with Locations					
6		1.2.F	SD-02		Shop Drawings and Calculations					
7		1.2.G	SD-01		Restraint Detail Index					
20 05 53					**Identification for Mechanical**					
2		1.2.A	SD-03	2.1	Pipe Markers: Pressure Sensitive					

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4		1.2.A	SD-03	2.2	Valve Tags and Cold Piping Accessory Tags					
5		1.2.A	SD-03	2.3	Equipment Labels					
6		1.2.A	SD-03	2.4	Access Panel and Ceiling Identification Markers					
8		1.2.B	SD-01		Application Schedule: Valve Tags					
20 07 00					**Insulation for Mechanical**					
1		1.2.A	SD-03	2.1.C	Lagging Fabric					
2		1.2.A	SD-03	2.1.D	Thermal Insulation Coatings					
3		1.2.A	SD-03	2.1.E	Insulating Cement					
4		1.2.A	SD-03	2.1.F	Vapor Barrier Coating					
5		1.2.A	SD-03	2.1.G	Plastic Insulation Covers					
6		1.2.A	SD-03	2.2	Interior, Above Grade, Piping System Insulation					
7		1.2.A	SD-03	2.3.A.1	Supply Air Duct Insulation: Concealed					
8		1.2.A	SD-03	2.3.A.2	Supply Air Duct Insulation: Exposed Rectangular					
9		1.2.A	SD-03	2.3.A.3	Supply Air Duct Insulation: Exposed Round					
10		1.2.B	SD-01		Application Schedule: Insulation and Thickness					
22 05 00					**Common Work Results for Plumbing**					
1		1.2.A	SD-03	2.2	Dielectric Pipe Protection					
2		1.2.A	SD-03	2.3	Escutcheons					
3		1.2.B	SD-02		Substantial Deviations					
22 05 23					**General Duty Valves for Plumbing**					
1		1.2.A	SD-03	2.2.A.1	Valves 2 Inches and Smaller: Isolation Ball Valves					
22 11 16					**Domestic Water Piping**					
1		1.2.B	SD-03		NSF 61 Data					
22 11 19					**Domestic Water Specialties**					
1		1.2.A	SD-03	2.2	Hose Bibs					
2		1.2.A	SD-03	2.3	Dielectric Nipples					
3		1.2.B	SD-03		NSF 61 Data					
22 13 16					**Sanitary Waste and Vent Piping**					
1		1.2.B	SD-01		Application Schedule: Product and Materials for Piping and Fittings					
22 13 19					**Sanitary Waste Piping Specialties**					
1		1.2.A	SD-03	2.1.A	Vinyl Tile Cleanout					
2		1.2.A	SD-03	2.1.B	Carpeted Floor Cleanout					
3		1.2.A	SD-03	2.1.C	Wall Cleanout					

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4		1.2.B	SD-02		Shop Drawings: Contractor Fabricated Items					
22 42 16					**Commercial Lavatories and Sinks**					
1		1.2.A	SD-03	2.2.A	S-1					
22 42 39					**Commercial Faucets, Supplies, and Trim**					
1		1.2.A	SD-03	2.1	Supplies and Trim					
2		1.2.A	SD-03	2.2	Accessories					
3		1.2.A	SD-03	2.3.A	F-1 Double Compartment Sink Faucets					
4		1.2.B	SD-01		Application Schedule: Faucet, Supplies and Trim schedule					
23 05 00					**Common Work Results for HVAC**					
1		1.2.A	SD-03	2.2	Balancing Cocks					
2		1.2.A	SD-03	2.3	Flexible Connectors					
3		1.2.A	SD-03	2.4	Air Vents					
4		1.2.A	SD-03	2.5	Dielectric Pipe Protection					
5		1.2.A	SD-03	2.6	Escutcheons					
6		1.2.B	SD-02		Substantial Deviations					
23 05 23					**General Duty Valves for HVAC**					
1		1.2.A	SD-03	2.2.A.1.a	Valves 3 Inches and Smaller: Isolation Gate Valves					
2		1.2.A	SD-03	2.2.A.1.b	Valves 3 Inches and Smaller: Isolation Ball Valves					
3		1.2.A	SD-03	2.2.A.1.c	Valves 3 Inches and Smaller: Drain Valves					
23 05 93					**Testing, Adjusting and Balancing for HVAC**					
1		1.2.A	SD-01		Balancer Qualifications and Balancing Plan					
23 21 13					**Hydronic Piping**					
1		1.2.A	SD-03	2.2	Heating System Fluid					
2		1.2.A	SD-03	2.3	Heating System Chemical Cleaning Compound					
3		1.2.B	SD-01		Application Schedule: Product and Materials for Piping and Fittings					
23 31 13					**HVAC Ducts and Casings**					
1		1.2.A	SD-03	2.1.B	Duct Sealant					
2		1.2.B	SD-02		Shop Drawings: Special Fabrications					
3		1.2.C	SD-02		Shop Drawings: Substantial Deviations					
23 33 11					**Air Duct Accessories**					
1		1.2.A	SD-03	2.2.A	Flexible Connections: Non-Insulated Ductwork					
2		1.2.A	SD-03	2.2.B	Flexible Connections: Insulated Ductwork					

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Date _____

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10/10/2017	Project: AK State Troopers Dispatch Relocation		Contractor:	
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SD-01 Preconstruction; SD-02 Shop Drawings; SD-03 Product Data; SD-04 Samples; SD-05 Design Data; SD-06 Test Report; SD-07 Certificates; SD-08 Manufacturer's Instructions; SD-09 Manufacturer's Report; SD-10 O&M Data; SD-11 Closeout; SD-12 LEED

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Item No.	Transmittal No.	Spec. Section or Drawing No.	Submittal Description	Spec. Paragraph or Drawing Detail No.	Item Description	Contractor's Scheduled Submittal Date	Actual: Submittal Date	Actual: Return Date	Status	Review Comments
										Corrections or comments do not relieve Contractor from compliance with Contract Documents. Submittals are reviewed only for general conformance with the design concept of the project and general compliance with the Contract Documents. The Contractor is responsible for confirming compliance with the Contract Documents, confirming & correlating all quantities & dimensions, selecting fabrication processes, techniques of construction, coordinating his work with that of other trades, and existing conditions; and performing his work in a safe and satisfactory manner.
3		1.2.A	SD-03	2.3	Turning Vanes					
4		1.2.A	SD-03	2.4	Duct Access Doors					
5		1.2.A	SD-03	2.5	Spin-In Fittings					
6		1.2.A	SD-03	2.6	Preinsulated Plenum Wall and Access Doors					
7		1.2.B	SD-02		Shop Drawings: Contractor Fabricated Items					
23 33 13					**Dampers**					
1		1.2.A	SD-03	2.2.A	Volume Control Dampers					
2		1.2.A	SD-03	2.3.A	Insulated Motorized Control Dampers					
3		1.2.B	SD-02		Shop Drawings: Contractor Fabricated Items					
23 33 46					**Flexible Ducts**					
1		1.2.A	SD-03	2.1.C	Flexible Duct					
23 33 53					**Acoustical Lining**					
1		1.2.A	SD-03	2.1	Duct Liner					
23 36 16					**Variable - Air - Volume Units**					
1		1.2.A	SD-03	2.1	Variable Air Volume Terminal Unit					
2		1.2.B	SD-01		Application Schedule: VAV Boxes					
23 37 13					**Diffusers, Registers and Grilles**					
1		1.2.A	SD-03	2.2	Louvered Grille/Register					
2		1.2.A	SD-03	2.3	Slot Diffuser					
3		1.2.B	SD-02		Shop Drawings: Contractor Fabricated Items					
23 81 33					**Exterior Cooling Units**					
1		1.2.A	SD-03	2.1	Cooling Units: AC- 1/AC-2					
2		1.2.A	SD-03	2.5	Control System					
3		1.2.A	SD-03	2.6	Compressor					
4		1.2.B	SD-02		Shop Drawing: System Piping					
26 05 10					**Basic Materials and Methods**					
1		1.5.A	SD-03	2.1	Raceways					
2		1.5.A	SD-03	2.2	Conduit and Tubing					
3		1.5.A	SD-03	2.3	Wires and Cables					
4		1.5.A	SD-03	2.4	Outlet Boxes					
5		1.5.A	SD-03	2.5	Wiring Devices and Plates					
6		1.5.A	SD-03	2.6	Overcurrent Protection Devices					
7		1.5.A	SD-03	2.7	Panelboards					
8		1.5.A	SD-03	2.8	Fasteners					
9		1.5.A	SD-03	2.9	Grounding					

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10		1.5.A	SD-03	2.10	Interior Lighting					
11		1.5.A	SD-03	2.11	Occupancy Sensors					
12		1.5.A	SD-03	2.12	Fire Alarm System					
13		1.5.A	SD-03	2.13	Telecommunications System					

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