

**TITLE II SERVICES
ISSUE FOR BID**

OUTLINE SPECIFICATIONS

**SHEPPARD AFB, TX
FOOD COURT
PIZZA HUT
DUNKIN DONUTS**



Good Fulton & Farrell Architects

**AAFES-PL-Z 7300041161
GFF PROJECT NUMBER 10119
August 29, 2012**

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SECTION 01 10 00**SUMMARY**

1.1 PROJECT INFORMATION

- A. Project Identification: AAFES Project No. 3755-10-000003.
 - 1. Project Location: Sheppard Air Force Base; Wichita Falls, TX
- B. Owner: Army and Air Force Exchange Service (AAFES).
 - 1. AAFES Contracting Office: Tory Hardy, C.P.M., PMP; Army & Air Force Exchange Service; 3911 S. Walton Walker; Dallas, TX 75236; (214) 312-6981
- C. Architect: Scott Wegener; Good, Fulton & Farrell Architects; 2808 Fairmount, Suite 300; Dallas, TX 75201; (214) 303-1500.
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. MEP Engineer: Larry Wuistingner; Koegel Associates, Inc.; 2626 Cole Ave., Suite 220; Dallas, TX 75207; (214) 754-9096
- E. AAFES Project Manager: Mike Williams; Army & Air Force Exchange Service; 3911 S. Walton Walker; Dallas, TX 75236; (214) 312-3642.
- F. Project Web Site: Administered by AAFES.

1.2 STATEMENT OF WORK

- A. Scope: The work covered by these specifications consists of furnishing all, supervision, labor, equipment, and materials as necessary to perform all operations required to complete construction for adding new Dunkin Donuts, Pizza Hut food concepts with Food Court upgrades and back of house kitchen work. Other concessions are existing and will remain open during operation, with no work included in this contract. The food court will contain upgrades including relocating an existing drink station. The work is to be performed in accordance with the specifications and the applicable drawings, and subject to the terms and conditions of the contract. **All trenching is to be performed at night.**
- B. Location: The work to be performed is located at the southeast corner of 3rd Ave. and Ave. F at Sheppard AFB in Wichita Falls, TX.
- C. Principal Features:
 - 1. The project consists of added Food Concepts and will include electrical, mechanical and plumbing work to incorporate Dunkin Donuts and Pizza Hut.
 - 2. Existing on-site utilities will be modified. The work must be planned to provide continuous service to existing on-site buildings while they are occupied. Trenching and utility work will need to be done after business hours and will require night work.
 - 3. A new cooler freezer will be added outside in the front and will require power ventilation, housekeeping pad and screen fence.

- D. General Provisions: The Contractor is advised to take note of the following General Provisions of the Contract: Cleaning up; Material and Workmanship; Accident Prevention; Protection of Existing Vegetation, Structures, Utilities and Improvements; Operation and Storage Areas; Site Investigation; Permits and Responsibilities. Copies of the General Provisions may be obtained from the Contracting Officer.
- E. Type of Contract: Single prime contract.
- F. Phased Construction: Two phases.

1.3 SPECIAL BASE REQUIREMENTS

- A. General working hours on Base are from 7:30 A.M. to 4:30 P.M., Monday – Friday excluding Federal Holidays.
 - 1. Sheppard AFB BCE shall be given 48 hours advance written notice when deviations are desired. This will allow assignment of additional inspection forces when the contracting officer determines that they are reasonably available. If such force is reasonably available, the contracting officer may authorize the contractor to perform work during periods other than normal duty hours/days; however, if inspectors are required to perform in excess of their normal duty hours/days solely for the benefit of the contractor, the actual cost of inspection at overtime rates will be charged to the contractor and will be deducted from the final payment of the contract amount. The contractor shall coordinate with Post Military Police prior to performing work after normal duty hours.
 - 2. Sheppard AFB may require special access requirements during times of heightened security measures and/or force protection events and Contractor may need to adjust schedules and access accordingly. Contractor will be notified by the installation in the event of such occurrence.
- B. No streets will be blocked without Base headquarters approval.
- C. Contractor shall immediately clean up any debris tracked on to the Base streets resulting from this construction operation.
- D. Construction areas including equipment storage areas shall be kept clean and neat.
- E. No burning is permitted on the Base.

1.4 UTILITIES (WATER, GAS AND ELECTRICITY)

- A. Existing hose bibbs and hydrants will be used to obtain water for this project. The Contractor will not be charged for consumption of utilities (water, gas and electricity).
- B. The Contractor shall provide and use the proper backflow prevention devices. The Contractor shall provide documentation of proper/current certification of the devices and proper/current certification of the installer.

1.5 LAYING OUT WORK

- A. Layout: Dimensions and elevations indicated in layout of work shall be verified by the Contractor. Discrepancies between Drawings, specifications, and Conditions shall be referred to the Contracting Officer in writing for adjustment before work affected is performed. Failure to make such notifications shall place responsibility upon the Contractor to carry out work in a satisfactory and workmanlike manner.
- B. The Contractor shall be held responsible for the location and elevation of all the construction contemplated by the construction documents.
- C. Prior to commencing work, the Contractor shall carefully compare and check all Architectural, Structural, Mechanical, and Electrical drawings, each with the other, that in any way affect the locations of elevation of the work to be executed by him, and should any discrepancy be found, he shall immediately report the same to the Contracting Officer for verifications and adjustment. Any duplication of work made necessary by failure or neglect on the Contractor's part to comply with this function shall be done at his sole expense.
- D. Field Dimensions: The drawings accompanying these specifications indicate generally the design and arrangement of all apparatus, fixtures, accessories, etc. necessary to complete the work required. The exact location or arrangement of equipment is subject to minor changes necessitated by field conditions and shall be made as required without additional cost to AAFES. Measurements shall be verified by actual observations at the construction site, and the Contractor shall be responsible for all work fitting into place in a satisfactory and workmanlike manner meeting the approval of the Contracting Officer.

1.6 EXISTING OVERHEAD OR UNDERGROUND WORK

- A. Carefully check the site where this project is to be erected and observe any overhead wires and equipment. Any such work shall be moved, replaced, or protected, as required, whether or not shown or specified.
- B. Attention is directed to the existence of pipe and other underground improvements which are shown on the drawings. All reasonable precautions shall be taken to preserve and protect all such improvements shown on the drawings.
- C. Locations of underground lines, shown on the drawings, are based on the best available sources, but are to be regarded as approximate only. Exercise extreme care in locating and identifying these lines before excavating in adjacent areas.

1.7 INTERRUPTION OF EXISTING UTILITIES SERVICES

- A. The Contractor shall perform the work under this Contract with a minimum of outage time for all utilities. Interruption shall be by approved section of the utility. In some cases, the Contractor may be required to perform the work while the existing utility is in service. The existing utility services may be interrupted only when approved by the Contracting Officer. When it is necessary to interrupt the existing utilities, the Contractor shall notify the Contracting Officer and facilities engineer in writing at least seven work days in advance of the time he desires the existing service to be interrupted. The interruption time shall be kept to a minimum. Depending upon the activities at the facility which require continuous service from the existing utility, an interruption may not be subject to schedule at the time desired by the Contractor. In such cases the interruption may have to be scheduled at a time of minimum requirement of demand for the utility. The amount of time requested by the Contractor for interruption of existing utility services shall be as approved by the Contracting Officer.

1.8 EXCAVATION

- A. Contractor shall obtain a valid Air Force Authorization Form *Base Civil Engineering Work Clearance Request* from the Construction Supervisor, Lester Givens 940-676-5622. Make the changes and send to any jurisdictions, sections, elements, offices and/or organizations not located at Sheppard AFB.

1.9 WELDING PERMIT

- A. Prior to commencing any welding, the Contractor shall obtain a welding permit from the Sheppard AFB Fire Department.

1.10 BARRICADES AND WARNING DEVICES

- A. The Contractor shall provide barricades and lighting devices, in accordance with Manual for Uniform Traffic Control Devices by Department of Transportation, latest Edition, at all points of excavation and construction in vehicle traffic areas.

1.11 PROTECTION FOR OPEN FLAME DEVICES

- A. When open flame and/or spark producing devices, i.e., acetylene oxygen welding equipment, electric arc welding, etc., are employed for job accomplishment, the following procedures are mandatory:
 - 1. Inspect all surroundings and equipment to insure that combustible substances are not present in any area where contact of metal at a temperature above the flashpoint of any compound is possible.
 - 2. Ensure that no open containers or spills of combustible substances are present.
 - 3. Ensure that ignition is not possible by conduction, convection, radiation, or dispersion of molten metal.
 - 4. Proper protection equipment and practices will be used, i.e., fireproof blankets, wetting of surrounding area, removal of combustible materials where practicable, earth filled backing and portable fire extinguishers of proper type on hand.
 - 5. When the above devices are being used notify the Base Fire Department 24 hours ahead of usage.

1.12 FIRE PROTECTION

- A. The Contractor shall at all times maintain good housekeeping practices to reduce the risk of fire damage. All scrap materials, rubbish, and trash shall be removed daily from in and about the building and shall not be permitted to be scattered on adjacent property.
- B. Suitable storage space shall be provided 50 feet minimum outside the building area for storing flammable materials and paints; no storage will be permitted in the building. Excess flammable liquids being used inside the building shall be kept in closed metal containers and removed from the building during unused periods.
- C. A contractor shall provide a fire extinguisher at each location where cutting and welding is being performed. Where electric or gas welding or cutting is done, interposed shields of incombustible material shall be used to protect against fire damage due to sparks and hot metal. When

temporary heating devices are used, a watchman shall be present to cover periods when other workmen are not on the premises.

- D. The Contractor shall provide fire extinguishers in accordance with the recommendations of NFPA Nos. 10 and 241. However, in all cases a minimum of four fire extinguishers shall be available for each building.
- E. Fire Codes: The Contractor shall obey all requirements of the National Fire Codes, Air Force Fire Regulations and Base Fire Regulations, as they relate to this work on base.

1.13 WORK BY OTHERS

- A. Work not included: Except for such auxiliary work as is shown or specified or is necessary as a part of the construction, the following work is not included in the Contract:
 - 1. Any work shown, but marked "NOT IN CONTRACT" (N.I.C.).
 - 2. Any work indicated to be furnished and installed by the Exchange.
 - 3. Any work indicated to be furnished and installed by the Vendors or Concessionaires.

1.14 AAFES FURNISHED AND INSTALLED EQUIPMENT

- A. See Specification Section 01 10 17: AAFES Furnished and Installed Equipment.

1.15 AAFES FURNISHED-CONTRACTOR INSTALLED EQUIPMENT

- A. See Specification Section 01 10 18: AAFES Furnished Contractor Installed Equipment.

1.16 ALIGNMENT OF JOINTS IN FINISH MATERIALS

- A. It shall be the responsibility of the Contractor to make certain in the installation of jointed floor, wall, and ceiling materials that:
 - 1. The joints align through in a straight line and in both directions wherever possible.
 - 2. The joints relate to all openings and breaks in the structure and be symmetrically placed wherever possible. This includes heating registers, light fixtures, equipment, etc.
 - 3. If, because of the non-related sizes of the various materials and locations of openings, etc., it is not possible to accomplish the above, the Contractor shall meet with the Contracting Officer to determine the most satisfactory arrangement. The Contractor shall establish center lines for all trades.

1.17 INTEGRATING WORK

- A. All streets, buildings, and other improvements shall be protected from damage.
- B. Contractor's operations shall be confined to the immediate vicinity of the project work and shall not in any way interfere with or obstruct the ingress or egress to and from street or adjacent property.

- C. If new work is to be connected to existing work, special care shall be exercised not to disturb or damage the existing work more than necessary. All damaged work shall be replaced, repaired, and restored to its original condition at no cost to the Exchange Service.

1.18 HEADROOM UNDER PIPES

- A. All horizontal runs of plumbing and heating pipes and/or electrical conduit suspended from ceilings shall provide for a maximum headroom clearance, but in no case shall this clearance be less than 7'-0" without written consent from the Contracting Officer. Where piping or conduit is left exposed within a room, the same shall run true to plumb, horizontal or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.

1.19 PATCHING GOVERNMENT-OWNED FACILITIES

- A. Government-owned structures, facilities, streets, curbs, walks, etc., that are damaged or removed due to required excavations or other construction work, shall be patched, repaired or replaced, and be left in their original state of repair by the Contractor, to the satisfaction of the Contracting Officer and of authorities having jurisdiction thereover.

1.20 LOCATION OF EQUIPMENT AND PIPING

- A. Drawings showing location of equipment, piping, ductwork, etc., are diagrammatic and job conditions shall not always permit their installation in the location shown.
- B. When this situation occurs, it shall be brought to the Contracting Officer's attention immediately and the relocation determined in a joint conference. The Contractor will be held responsible for the relocating of any items without first obtaining the Contracting Officer's approval. He shall remove and relocate such items at his own expense if so directed by the Contracting Officer.

1.21 OVERLOADING

- A. The Contractor shall be responsible for overloading any part or parts of structures beyond their safe calculated carrying capacities by placing of materials, equipment, tools, machinery, or any other item thereon. No loads shall be placed on floors or roofs before they have attained their permanent and safe strength.

1.22 STANDARDS

- A. Any material specified by reference to the number, symbol, or title of a specific standard such as Commercial Standard, a Federal Specification, a trade association standard, or other similar standard shall comply with the requirements in the latest revision thereof, and any amendment or supplement thereto, in effect on the date of invitation for proposals, except as limited to type, class, or grade, or modified in such reference, and except as otherwise indicated.
 - 1. The standard referred to, except as modified in the specifications, shall have full force and effect as though printed in these specifications. These standards are not furnished to bidders for the reason that the manufacturers and trades involved are assumed to be familiar with their requirements.

- a. Where Federal Specifications are referred to as a measure of quality and standard, they refer to Federal Specifications established by the Procurement Division of the United States Government and are available from the Superintendent of Documents, U.S. Government Printing Office.
- b. Where Federal Specification numbers are used, they refer to the latest edition including amendments thereto.
- c. Where Commercial Standards are referred to as a measure of quality, standard, and method of fabrication, they refer to Commercial Standards issued by the U.S. Department of Commerce.
- d. Where A.S.T.M. Serial Numbers are used, they refer to the latest tentative specifications, standards specifications, standards methods, or standard method of testing issued by the American Society for Testing and Materials.

1.23 CERTIFICATE OF CONFORMANCE

- A. Except where tests and/or inspections in connection with structural materials are specified or required by applicable laws, rules, and regulations, manufacturer's certificate covering conformance with the requirements of the above mentioned Federal Specifications and Commercial Standards may be acceptable in lieu of such items. Such certificates shall be furnished to the Contracting Officer for all items so specified.

1.24 OCCUPANCY BY THE EXCHANGE

- A. The Exchange shall reserve the right and privilege of partial occupancy during and prior to the absolute completion of the total work. Access shall be allowed at all times to the Exchange and its own Contractors in the endeavor.

1.25 TESTS AND REPORTS

- A. See Specification Section 01 40 00: Quality Control.

1.26 REFERENCES

- A. All references to the word "Government" in the specifications shall mean Army and Air Force Exchange Service (AAFES).
- B. Wherever the word "provide" is used in the Contract Documents as a directive, it shall be interpreted as meaning "provide and install completely and ready for use".
- C. Definitions:
 1. Vendor: Person or persons selling any material item.
 2. Base or Facility: Location on which Exchange is being remodeled.
 3. Concessionaire: Person who is directly responsible for the lease of and operation of the concessions such as Beauty Shop and Barber Shop.
 4. Architect-Engineer: That person or firm responsible for preparing the working drawings and specifications.
 5. AAFES or Exchange: Army and Air Force Exchange Service.
 6. Inspection Agency: Project Inspector contracted by AAFES.

1.27 TOXIC MATERIALS

- A. Removal or disposal of toxic materials or asbestos is not included in this contract. If the Contractor encounters such materials, he shall immediately stop work and notify the Contracting Officer.

1.28 SUBMISSION OF PHOTOGRAPHS

- A. Contractor shall submit to the Contracting Officer digital photographs taken on or about the first of every month, showing the general conditions of the work as viewed from the north, south, east, west and interior. Photographs (minimum of 20) must accompany each Application for Payment. Each print shall be identified by date of exposure, project title, and AAFES Project Number, location and direction taken. The Contractor may also submit a video of the above requirements as an option to photographs.

END OF SECTION 01 10 00

SECTION 01 10 60**SAFETY POLICIES AND PROCEDURES****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Contractor required health and safety plan.
 - 1. Contractor is responsible for reading the Risk Assessment Plan and following the directions therein.
 - 2. Contractor must maintain OSHA permissible exposure limits related by the risk assessment: That is, 25 ppm (170 mg/cubic meter) during any 8 hour work shift for a 40-hour week
- B. Construction Hazard Plan.

1.2 RELATED SECTIONS

- A. Submittals - Section 01 33 00 (Construction Hazard Plan, Job Safety and Health Plan, Emergency Response Plan).
- B. Record Documents - Section 01 78 39.

1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
 - 1. OSHA 1910 R.E.G. - 29CFR, OSHA 1910.120
 - 2. Army Corp of Engineers EM 385-1-1

1.4 SUBMITTALS

- A. Submittals for AAFES approval - The following items shall be submitted for AAFES approval:
 - 1. Designation of Safety Representative: The Contractor shall designate in writing a qualified employee OSHA Trained under 1910.120 responsible for the overall supervision of all accident prevention activities. Duties shall include ensuring applicable safety requirements are incorporated into work methods and inspecting the job site to ensure that safety measures and instructions are actually being applied. This person shall be on site at all times that work is in progress.
 - 2. The Contractor shall be trained/certified in OSHA 1910.120 procedures. All other employees performing site work will meet OSHA 1910 training requirements for their job capacity.
- B. Submittals for Information Only - The following items shall be Contractor certified:
 - 1. Job Hazard Analysis: Contractor shall develop a job hazard analysis for presentation at the pre-construction conference. The Contractor's job hazard analysis shall list potential hazards that could arise during the course of the work.

2. Job Safety and Health Plan.

- a. The Contractor shall develop a Job Safety and Health Plan for presentation at the Pre-construction conference. The Contractor's Safety Plan shall make whatever provisions are necessary to conduct his work in accordance with current OSHA standards.
- b. The safety and health plan must specifically address the excavation portion of construction and will be specific to perchloroethylene (tetrachloroethylene) (PCE), and incorporate decontamination procedures for personnel and equipment, continuous vapor monitoring, a prohibition against eating in proximity to the site, and a prohibition against the smoking of tobacco products in the proximity to the site.
- c. The following are minimum requirements for the health and safety plan:
 1. The Contractor is responsible for all compounds and degradation products addressed by the Risk Assessment Plan.
 2. Specialized Designs: Specialized designs will be provided when the situation requires. Examples of such designs include, but are not limited to, vapor barriers in areas of known vapor hazard.
 3. Safety Plans: Safety Plans will be the responsibility of the Contractor for construction areas identified by the installation and/or AAFES as areas of known hazards only. These plans are required by 29 CFR 1910 and are the responsibility of the Contractor. This requirement will be coordinated through the Health and Safety Program of the military installation by the Contractor.
 4. Minimum Requirements for the Health and Safety Plan are as follows:
 - (a) Must be kept on site, and must be written.
 - (b) Will contain a hazard analysis (safety and health risk) for each site task and operation (to be supplied by the installation).
 - (c) Will include employee training (per paragraph (3) of 1910.120).
 - (d) Will include personal protective equipment to be used by employees for each of the site tasks and operations (paragraph (g) (5) of 1910.120).
 - (e) Will include provision for medical surveillance (paragraph (f) of 1910.120).
 - (f) Will include the frequency and types of air monitoring, personal monitoring, environmental sampling techniques, instruments to be used (their maintenance and calibration).
 - (g) Will include a site control program (per paragraph (d) of 1910.120) to be coordinated with the installation.
 - (h) Will include a decontamination procedure (per paragraph (k) of 1910.120).
 - (i) Will include an emergency response plan (per paragraph (1) of 1910.120).
 - (j) Will include a confined space entry procedure (per 1910.146, 147 or program equivalent).
 - (k) Will include provision for spill containment (per paragraph (j) of 1910.120).
 - (l) Will include pre-entry briefings (prior to each site task activity) for all employees involved in the task, supervision, or emergency response.
 - (m) Written verification of adherence to the "plan" by a Safety and

Health Supervisor is required (the supervisor must meet the 1910.120 training requirements for supervisors).

- (n) Deficiencies will be corrected immediately upon discovery and after consultation with the AAFES Contracting Officer.

- d. Hazard Response Plan: The unplanned or non-predicted discovery of such hazards as transite pipe, contaminated soils, and other possible hazards will be addressed within an Emergency Response Plan (EMR) by all contractors. This requirement will be coordinated through the Health and Safety Program of the military installation by the contractor (sample provided).
- e. Material Safety Data Sheets will be maintained at the site for all hazardous materials in use.

1.5 MONTHLY SAFETY MEETINGS

- A. The Base will schedule subsequent safety meetings with Contractor and subcontractor personnel on a monthly basis. Minutes of safety meetings shall be prepared and signed by the Contractor. Concurrence signed by Inspection Section and the original submitted to the Contracting Officer for inclusion in the contract file.

1.6 ACCIDENT REPORTING AND RECORD KEEPING

- A. Accident reporting and record keeping shall be in accordance with Base requirements. Telephonic reports of injuries or property damage will be made as soon as possible after the incident and will be followed by a copy of an Accident Report.

1.7 LIFE OF CONTRACT REQUIREMENTS

- A. The Contractor shall comply with all provisions of this section during the life of the contract.

1.8 HEAD PROTECTION (HARD HATS)

- A. All work sites under this contract are designated Hard Hat Areas. The Contractor shall post the area and shall ensure that all personnel, vendors and visitors use hard hats while within the limits of the work site.

END OF SECTION 01 10 60

SECTION 01 13 00

SAFETY REGULATIONS AND CODES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Reference Standards.
- B. Licenses and Permits
- C. Safety.
- D. Fire Safety.
- E. Affirmative Procurement Program
- F. Industrial Ventilation
- G. Use of Ionizing Radiation (IR).
- H. Use of Lasers.
- I. Use of Radioactive Materials
- J. Use of Radio Frequency (RF) Radiation.
- K. Use of Ultraviolet (UV) Radiation.
- L. Protection of Nesting Birds
- M. Historical or Cultural Artifacts
- N. Ozone Depleting Substances.
- O. Lead Base Paint.
- P. Cleaning & Debris Control
- Q. Nuisance Dumping & Polluting Activities
- R. Stormwater Pollution Prevention
- S. Excavation at IRP Sites
- T. Contaminated Soil
- U. Suspected Hazardous Materials
- V. Oil-Filled or Impregnated Electrical Components
- W. Hazardous Waste Testing

- X. Hazardous Material Inventory
- Y. Spill Response and Reporting
- Z. Waste Disposal and Environmental Protection.

1.2 REFERENCE 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. 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.
- C. Obtain a copy of standards referenced in the various Specification Sections. Maintain a copy at the jobsite during execution of Work to which the standard applies.
- D. Construction that is not governed by the contract specifications will be governed by the more stringent provisions of the latest published edition or statute adopted edition, of the following applicable codes, regulations and standards.

ADA	Americans With Disabilities Act Accessibility Guidelines
AFR	Air Force Regulations
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
FAR	Federal Acquisition Regulations
IBC	International Building Code
IMC	International Mechanical Code
IPC	International Plumbing Code
NEC	National Electrical Code
NFPA	National Fire Code
OSHA	Occupational Safety and Health Act
UFC	Unified Facilities Criteria

Other applicable codes and standards as applicable or as referenced by the individual specification Sections.

1.3 LICENSES AND PERMITS

- A. The Contractor shall obtain and maintain current for the duration of this Contract, all required Federal, State and local licenses and permits. All associated fees and taxes shall be paid by the Contractor without additional cost to the Government.
- B. Obtain from base security all required vehicle and entry permits.
- C. Obtain from the Contracting Officer any additional Sheppard AFB required permits. Current permit requirements shall be provided to the Contractor at the preconstruction conference.
- D. Obtain, fill-out and Submit for AF Form 103 to Lester Givens DS2 Construction Supervisor.

1.4 SAFETY

- A. Comply with all Federal and State regulations concerning safety of personnel and equipment. All Contractor personnel shall wear hard hats and steel toe safety shoes while on the project site. In addition, all personnel shall wear hearing protection (ear muffs or ear plugs) when inside the power plant, excluding office areas, restrooms, break rooms and other "quiet" areas.
- B. Ensure that lock out, tag out procedures are established and used as directed by 29 CFR 1910.145. Comply with the lock out, tag out procedures in use by CH&PP personnel. Ensure that contractor's personnel on site are trained on the government's procedures.
- C. Comply with all safety, traffic and protection requirements in effect on Sheppard AFB. Government will brief the Contractor on these requirements at the preconstruction conference.
- D. Work areas in this Project may be classified as "permit-required confined spaces" or "non-permit required confined spaces." The Contractor's Certified Industrial Hygienist will determine the confined space status of the Project areas. Regulations and procedures for entry into "permit-required confined spaces" are contained in 29 CFR 1910.146 and 8 AAC 61.010.14. The Contractor is responsible for ensuring the safety of his employees in confined spaces according to these regulations.
- E. Confined Space Permit:
 - 1. Provisions for confined space are outlined in 29CFR 1910.146 and ANSIZ117.1 1989 and shall be followed throughout Project.
 - 2. Sheppard AFB Contact for information regarding confined Space issues is Ground Safety: Construction Supervisor, Lester Givens 940-676-5622. However, the Contractor shall process any permits required for confined space through his own safety Manager and Permit Space Program.
- F. Provide safety barriers around open excavations, openings in floors and other hazards created by the Contractor's activities.
- G. The Contracting Officer may direct the Contractor to cease activities which, in their opinion, are unsafe.

1.5 FIRE SAFETY

- A. Comply with all fire safety and protection requirements in effect on Sheppard AFB. Government will brief the Contractor on these requirements at the preconstruction conference.
- B. Prior to beginning any welding, use of open flame device, or any activity that produces sparks, obtain a "hot work permit" (From Fire Chief David Mounsey 940-676-5738) from Sheppard AFB Fire Department. The permit shall be **renewed each day** welding or open flame devices will be used.
- C. If the contract work requires numerous days of hot work, the Contractor may elect to have one of his on-site personnel designated as a Permit Authorizing Individual (PAI). The Contractor's PAI may issue hot work permits at the work site, thus avoiding the requirement for daily permits issued by the Fire Department.
- D. The Contractor's PAI shall be the on-site superintendent, a foreman, the Contractor's Safety Manager, or other individual with sufficient knowledge and experience to recognize unsafe work practices or conditions and having authority to stop work immediately if such unsafe practices or conditions are observed. To be designated as a PAI, a person must schedule and successfully complete PAI certification training offered by the Base Fire Department. PAI certification training is estimated to last 60 to 90 minutes.
- E. Fire Department personnel may periodically visit the site to ensure the Contractor is complying with fire safety requirements. A PAI's certification may be revoked if the PAI has failed to issue permits on days when hot work is performed, or if unsafe practices or conditions are observed.
- F. Questions concerning these requirements may be directed to David Mounsey, Fire Chief, Sheppard AFB, 940-676-5738.
- G. The Contractor shall notify the Fire Department at (940) 676-5738 a minimum of 48 hours before, and again immediately prior to, temporarily closing any street or paved building access, interrupting water service to any fire hydrant or interrupting the operation of any fire detection, alarm or suppression system. The fire Department shall be immediately notified upon reopening closed areas, restoration of water service to any fire hydrant, or reactivation of any detection, alarm or suppression system. This notification requirement is in addition to other contract requirements.
- H. Provide a 10 lb, ABC fire extinguisher at all work stations.
- I. Report a fire: Dial 911. Caller to identify self as being at "Sheppard AFB" to 911 dispatcher.

1.6 AFFIRMATIVE PROCUREMENT PROGRAM

- A. These standards apply to all new construction, demolition, rehabilitation, alteration, modification, repair, and maintenance of existing facilities.
- B. In an effort to comply with the affirmative procurement requirements of Section 6002 of the Resource Conservation Recovery Act (RCRA) and Executive Order 13101, the government strongly promotes the use of the recycled and recovered materials and products identified in the Environmental Protection Agency's Comprehensive Procurement Guidelines.

- C. Recycled and recovered materials and products must be considered first before any other materials and products will be accepted. Recycled and recovered materials and products must be used throughout the project unless they either do not meet the requirements of this specification, delay the progress of the work, or are cost prohibitive.
- D. Examples of these materials and products are detailed below. These are recommended quantities and represent minimum compliance. The actual requirement is to use the maximum amount of recycled material possible, while meeting the performance specifications. Contractor to visit EPA.gov website for additional information and a more complete listing of materials and requirements.

Type	Material	Recycled Material	%
Insulation	Rock wool	Slag	75
	Fiberglass	Glass cullet	20-25
	Loose fill & spray on (cellulose)	Postconsumer paper	75
	Perlite composition board	Postconsumer paper	23
	Plastic rigid foam	Recovered material	9
	Foam-in place	Recovered material	5
	Glass fiber reinforced	Recovered material	6
	Phenolic rigid foam	Recovered material	5
Wall Board	Structural fiberboard		80-100
	Laminated paperboard	Postconsumer paper	100
Carpet	Polyester carpet face fiber	Excludes severe wear applications	25-100
	Playground surfaces	Rubber or plastic	90-100
	Running tracks	Rubber or plastic	90-100
Cement/Concrete	Concrete & cement	Coal fly ash	15-35
	Concrete & cement	Ground granulated blast furnace (GGBF)	25-50
Flooring/Patio	Patio blocks	Plastic or plastic blends	90-100
	Patio blocks	Rubber or rubber blends	90-100
	Floor tiles	Rubber	90-100
	Floor tiles	Plastic	90-100
Landscaping	Paper based hydraulic mulch	Postconsumer paper	100
	Wood based hydraulic mulch	Recoverd wood and/or paper	100
	Compost		100

1.7 INDUSTRIAL VENTILATION

- A. Contact the Contracting Officer 10 working days prior to any industrial ventilation systems (systems which control a hazard) being evaluated for acceptance. Advance notification is required by Bioenvironmental Engineering (BE) to allow performance or observation of tests of any new or renovated system prior to initial startup to verify the system will control the hazard. BE will be present for tests of fan speed and rotation, fan motor load, and air flow in all hoods or branches.

1.8 USE OF IONIZING RADIATION (IR)

- A. Submit a written request for approval at least 30 calendar days before commencement of activities which require the use of IR generating devices.

- B. Submit request to the Base Radiation Safety Officer (RSO) with a courtesy copy to the Contracting Officer. Request shall include:
1. Description/Characteristics:
 - a. X-ray unit manufacturer
 - b. Model number
 - c. Serial number
 - d. Maximum kVp, mA, Sec
 - e. Ionizing radiation source/emitter (electron tube)
 2. The part of the AAFES contract describing work to be done at the base and the inclusive dates of such work.
 3. An acknowledgment that the RSO may make initial and periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Post or Base personnel.

1.9 USE OF LASERS

- A. Submit a written request for approval at least 30 calendar days before commencement of activities which require the use of a laser.
- B. Submit request to the RSO with a courtesy copy to the Contracting Officer. Request shall include:
1. Description/Characteristics:
 - a. Manufacturer.
 - b. Model.
 - c. Number of same units.
 - d. Serial number(s).
 - e. Laser medium.
 - f. Mode of operation (i.e. continuous wave (CW), single pulse, multiple pulse).
 - g. Maximum exposure time (train length).
 - h. I_{me} (sec) & wave length.
 - i. Energy/pulse (J) or CW power (W).
 - j. Pulse repetition frequency.
 - k. Pulse width.
 - l. Beam diameter (at 1/e point).
 - m. Beam divergence (at 1/e point).
 2. The part of the AAFES contract describing work to be done and the inclusive dates of such work.
 3. An acknowledgment that the RSO may make initial and periodic checks to ensure the contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Post or Base personnel.

1.10 USE OF RADIOACTIVE MATERIALS (RAM):

- A. Prior to bringing RAM onto Sheppard AFB property, the Contractor shall obtain permission from the RSO. To obtain approval, forward an application to the RSO, and a courtesy copy to the Contracting Officer at least 30 calendar days before the planned date for commencement of activities on the installation. Requests shall include:

1. A description of the proposed activities on NRC Form 241, Report of Proposed Activities in Non-Agreement States, (the 180-day limitation on the form does not apply to organizations holding an NRC license). Contractors possessing Agreement State Licenses shall also submit an NRC Form 241 to NRC in compliance with 10 CFR 150.21. Contractors requiring more than 180 days of operation per calendar year on the installation shall possess an NRC license.
2. The procedures established to ensure radiological health and safety of Base personnel and the public while on Army or Air Force installations on site and the name of the responsible Contractor representative.
3. A current copy of the applicable NRC, or Agreement State license. Expired licenses are unacceptable. To be valid at the installation, the license must either specifically state the installation by name on the license or state approval for work at temporary job sites anywhere in the United States where the NRC or Agreement State maintains jurisdiction. DOE or DOE prime contractors must provide, in lieu of a license, written certification of their exemption from NRC licensing requirements and cite the applicable exemption of 10 CFR.
4. The part of the AAFES contract describing work to be done and the inclusive dates of such work
5. An acknowledgment that the Base RSO may make periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Army or Air Force personnel and prevent potential contamination of Government property.

1.11 USE OF RADIO FREQUENCY (RF) RADIATION

- A. Prior to using equipment generating RF Radiation in excess of seven watts peak power and a frequency of 1000 MHz or greater on Sheppard AFB a written request must be submitted for approval at least 30 calendar days before commencement of activities which require the use of the RF generating device.
- B. Submit request to the RSO, with a courtesy copy to the Contracting Officer. Submittal shall include:
 1. Description.
 2. Nomenclature.
 3. Location of emitters.
 4. Quantity.
 5. Frequency (Mhz).
 6. Pulse width (microsec.).
 7. Pulse repetition freq. (pps).
 8. Peak power (kW).
 9. Antenna size (feet--horizontal/vertical).
 10. Antenna band width (degrees-- horizontal/vertical).
 11. Antenna gain (dB).
 12. Scan rate (rpm).
- C. The part of the AAFES contract describing work to be done at the base and the inclusive dates of such work.
- D. An acknowledgment that the RSO may make initial and periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Post or Base personnel.

1.12 USE OF ULTRAVIOLET (UV) RADIATION

- A. Submit a written request for approval at least 30 calendar days before commencement of activities which require the use of UV generating devices on Sheppard AFB.
- B. Submit request to the RSO, with a courtesy copy to the Contracting Officer. Request shall include:
 - 1. The part of the AAFES contract describing work to be done at the base and the inclusive dates of such work.
 - 2. An acknowledgment that the RSO may make initial and periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Post or Base personnel.

1.13 PROTECTION OF NESTING BIRDS

- A. Federal law prohibits disturbing bird nests containing eggs or birds too young to fly. Harassment of birds to force them to abandon an occupied nest is also illegal. If the Contractor removes nests or harasses birds in violation of federal and state law, the Contractor is responsible for any charges filed by U.S. Fish and Wildlife Service or State of Texas and is the liable party.
- B. If an occupied bird nest is discovered, the contractor shall cease activities in the vicinity of the bird nest until the young birds are able to fly and leave the nest under their own power.
- C. Cliff swallow nests are usually the greatest threat to construction projects. As a general rule, cliff swallows can begin nest construction any time between 10 May and 21 July.
- D. The Government is responsible for removing new nests in the vicinity of the work area prior to Notice to Proceed.
- E. The Contractor shall be responsible for control of new nest construction after issuance of NTP. The contractor shall survey the work area **daily** for new nest construction. To avoid project delays, the contractor shall remove all nests discovered before the nests have been completed and occupied.
- F. The contractor shall be responsible for any increased cost or delay resulting from a nest constructed and occupied in the work area after NTP has been issued.

1.14 DISCOVERY OF HISTORICAL OR CULTURAL ARTIFACTS

- A. Should any historical artifacts or cultural resources be unearthed, stop excavating and immediately notify the Contracting Officer.

1.15 OZONE DEPLETING SUBSTANCES

- A. No ozone depleting substances (refrigerants or any other compounds) shall be used in any capacity on this project unless specifically approved by the HazMart.

1.16 LEAD BASE PAINT

- A. No paint with a lead content of 0.06 percent or greater shall be used in any capacity on this project unless specifically approved by the HazMart.

1.17 CLEANING AND DEBRIS CONTROL

- A. During the term of this Contract, the Contractor shall remove any materials and equipment that are not required for the completion of the work as promptly as possible. All debris shall be removed from the site and legally disposed. The Contractor shall take particular care to eliminate any hazards created by his operations.
- B. The Contractor is responsible for any damage caused by his debris without additional cost to the Government.
- C. The Contractor shall maintain at all times during his work at this Project Site a strict windblown debris control program. This program shall ensure no windblown debris or other debris from his work shall contaminate or interfere with any access to or operation of any facility or any parking area, road or street.

1.18 NUISANCE DUMPING AND POLLUTING ACTIVITIES

- A. Polluting, dumping, or discharging of any harmful, nuisance, or regulated materials (such as concrete truck washout, vehicle maintenance fluids, residue from saw cutting operations, solid waste or hazardous substances) into building drains, site drains, streams, waterways, holding ponds or to the ground surface is not permitted. The contractor shall be responsible for any and all damages resulting from dumping or discharges. Further, the Contractor shall conduct activities in such a fashion to avoid creating any legal nuisance, including but not limited to, suppression of noise and dust, control of erosion, and implementation of other measures as necessary to minimize off site impacts of work activities.
- B. Fugitive Dust emissions (airborne dust generated by vehicles operating on unpaved surfaces, transfer or transport of dust producing materials, etc.) shall be controlled at the construction site, along haul routes and at staging areas. Water spraying shall be conducted as necessary to minimize fugitive dust generation.

1.19 STORMWATER POLLUTION PREVENTION

- A. Prior to clearing, grading or excavating, the Contractor shall obtain a Storm Water Pollution Prevention (SWPP) permit from the Base Civil Engineers Jay Gilmore (940-676-5704) and Darcas Pena (940-676-5719) and obtain a National Pollution Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA). Submit the SWPP Plan to the Contracting Officer for review and approval prior to submitting the plan to NDDOH. Ensure SWPP Plan includes Best management Practices. Additional permits may be required and shall be the responsibility of the Contractor
- B. If contaminated ground water is encountered, the contractor must notify CEV immediately via the 24/7 spill phone 940-676-5704 and 904-676-3275.

1.20 CONTAMINATED SOIL

- A. If unexpected contaminated soil is encountered while performing work, stop work immediately and contact the Contracting officer. Do not resume work until approved by the Contracting Officer.

1.21 SUSPECTED HAZARDOUS MATERIALS

- A. Any suspect hazardous materials encountered during demolition or construction shall immediately be brought to the attention of the Contracting Officer's representative and DS2 Base Environmental. Work shall not resume until the Contracting Officer is satisfied that the materials are not hazardous. Should they be found to be hazardous, the contractor shall immediately take steps to contain the material, so further damage and contamination does not occur. The contractor shall then submit a proposal for removal.

1.22 OIL-FILLED OR IMPREGNATED ELECTRICAL COMPONENTS

- A. Notify (Post or Base Environmental Safety Office and phone number) before demolition or installation of any oil-filled electrical equipment (for example: transformers and regulators). All transformers (both PCB and non-PCB-containing) and light ballasts (unless labeled "No PCBs") shall be disposed through the Sheppard AFB Hazardous Material and Waste Handling facility.

1.23 HAZARDOUS WASTE TESTING

- A. The Contractor shall subject a representative sample of each type of hazardous waste, or potentially hazardous waste, generated to TCLP (Toxic Characteristic Leaching Procedure) testing. Sampling and testing for appropriate metals, and volatile and semi-volatile chemicals shall be performed by an independent test agency that is regularly engaged in the sampling and testing of hazardous materials and waste. Provide the test results to Post or Base Hazardous Waste Facility before transferring the waste to the facility. Refer to the attached Waste Disposal and Borrow Pit Worksheet for additional hazardous waste handling requirements.

1.24 HAZARDOUS MATERIAL INVENTORY

- A. Contractor must submit an inventory of all hazardous materials to be used to include quantities. Inventory must be updated at completion of the project to indicate quantities used, spilled, and disposed of, etc.
- B. The Contractor shall provide the Hazardous Materials Pharmacy (HazMart) a list and quantity of all hazardous materials that the Contractor intends to bring onto Government property. The Contractor shall provide the HazMart with copies of all MSDSs and an inventory for each Hazardous chemical listed in OSHA Hazard Communication Standard 29 CFR 1910.1200 intended to be used. Each MSDS shall be on file prior to use of the chemical, and shall be maintained for all chemicals. Once the hazardous material is used, its quantity of use shall be reported to the HazMart along with the disposition of the container.
- C. Submit a completed Hazardous and Related Material Identification Form, and an MSDS for all materials listed on the form and brought on Base, to the Contracting Officer.

- D. If hazardous materials are not in their original container, the container containing the substance must be labeled.

1.25 SPILL RESPONSE AND REPORTING

- A. Spills of hazardous waste, hazardous materials or non-regulated substances such as oils, antifreeze, grease, latex paint, hydraulic fluid, etc. shall immediately be reported to Contracting Officer and DS2 Base Environmental for reporting purposes to local, state and federal agencies and proper clean-up action. If a spill occurs after normal working hours, or on a weekend or holiday, report spills to the Sheppard AFB Fire Department and request they contact Contracting Officer.
- B. The contractor is encouraged to have a supply of absorbent pads on-site to aid in immediate clean-up of smaller spills, such as oil, coolant or hydraulic fluid leaks from vehicles or equipment.
- C. Spill notification placards are to be placed on the job site CEV will provide format and required locations prior to construction.
- D. The contractor shall develop a spill plan. The format for the plan will be provided by CEV prior to construction.

1.26 WASTE DISPOSAL AND ENVIRONMENTAL PROTECTION

- A. The Contractor shall comply, and ensure that all subcontractors comply, with all Federal, State, local laws, and regulations, ordinances and standards related to environmental pollution control and abatement in effect and the specific requirements stated elsewhere in the Contract Documents.
- B. All hazardous wastes as defined in 40 CFR, Part 261, shall be collected and disposed of in accordance with 40 CFR, Parts 260-268. The Contractor is responsible for properly storing, marking, labeling, securing and transporting hazardous wastes. All hazardous wastes shall be collected in contractor furnished DOT/UN approved containers and taken to Sheppard AFB Hazardous Waste Facility for disposal. Call the Hazardous Waste Facility prior to transporting wastes to the facility to coordinate delivery of the waste materials. The Contractor shall not store hazardous waste on base for more than 30 days.
- C. Any previously unidentified suspected hazardous materials encountered during performance of the work of the contract shall immediately be brought to the attention of the Contracting Officer.
- D. All general construction wastes, other than those specifically allowed, or required, to be disposed of on-base shall be legally disposed at an off-base sanitary landfill.
- E. Comply with the requirements of "Sheppard AFB Waste Disposal" immediately following this Section.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION - (Not Used)

END OF SECTION 01 13 00

SHEPPARD AFB WASTE DISPOSAL

The Contractor shall obtain all permits required by federal, state and local laws for the construction activities involved. The Contractor shall perform all work in such a manner as to minimize the polluting of air, water or land and shall, within reasonable limits, control noise and the disposal of solid waste materials, as well as other pollutants. The Contractor shall ensure that all construction, repair, maintenance operations and practices and waste disposal performed under this contract shall be in strict compliance with all applicable city, county, state and federal environmental laws and regulations.

1. Hazardous and Non-hazardous Waste Disposal: There are no known existing sources of hazardous waste involved with this project. If the Contractor generates or discovers suspected hazardous waste it shall be brought to the immediate attention of the Contracting Officer for review and direction on how to proceed with handling and disposal. As part of the proposed implementation above and prior to on-site construction, the Contractor shall submit for approval, a plan for storing, characterizing and disposing of hazardous and non-hazardous waste materials resulting from the work under this contract. Waste includes, but is not limited to, paint waste, paint equipment cleaners and used paint containers. If any waste material is dumped in unauthorized areas, the Contractor shall remove the materials and restore the area to the condition of the adjacent undisturbed areas. Where directed and approved by the Contracting Officer, contaminated ground shall be excavated, characterized, stored, disposed of and replaced with suitable fill material at the expense of the Contractor. All waste disposal shall be in strict accordance with local, state and federal requirements and regulations. Waste paint, paint equipment cleaners and used paint containers shall be disposed of off base by the Contractor, at the Contractors' expense. Any soil contaminated through spillage shall be removed and disposed of in accordance with the requirements specified herein. Soil that is required to be removed shall be replaced by similar soil approved by the Contracting Officer.

SECTION 01 14 50**CUTTING AND PATCHING****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Requirements and limitations for cutting and patching of Work.

1.2 RELATED SECTIONS

- A. Section 01 10 00 - Summary.
- B. Section 01 33 00 - Submittals.
- C. Individual Product Specification Sections:
 - 1. Cutting and patching incidental to work of the section.
 - 2. Advance notification to other sections of openings required in work of those sections.
 - 3. Limitations on cutting structural members.

1.3 SUBMITTALS

- A. Submit written request in advance of cutting or alteration which affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of AAFES or separate contractor.
- B. Include in request:
 - 1. Identification of Project.
 - 2. Location and description of affected Work.
 - 3. Necessity for cutting or alteration.
 - 4. Description of proposed Work and Products to be used.
 - 5. Alternatives to cutting and patching.
 - 6. Effect on work of AAFES or separate contractor.
 - 7. Written permission of affected separate contractor.
 - 8. Date and time work will be executed.

1.4 MATERIALS

- A. Primary Products: Those required for original installation.

1.5 EXAMINATION

- A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
- B. After uncovering existing Work, assess conditions affecting performance of work.

- C. Beginning of cutting or patching means acceptance of existing conditions.

1.6 PREPARATION

- A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work.

1.7 CUTTING

- A. Execute cutting and fitting to complete the Work.
- B. Uncover work to install improperly sequenced work.
- C. Remove and replace defective or non-conforming work.
- D. Remove samples of installed work for testing when requested.
- E. Provide openings in the Work for penetration of mechanical and electrical work.
- F. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

1.8 PATCHING

- A. Execute patching to complement adjacent Work.
- B. Fit Products together to integrate with other Work.
- C. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- D. Employ original installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.
- E. Restore work with new Products in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
- H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

END OF SECTION 01 14 50

SECTION 01 22 00**UNIT PRICES****PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

- A. Unit price shall be added to Contractor's proposal on AAFES Solicitation Form 4450-024, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if concealed conditions cause quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price 1: Trenching

1. Description: Trench work
2. Unit of Measurement: Linear Feet

B. Unit Price 1: Tile patch work

1. Description: Tile patch work
2. Unit of Measurement: Square Foot

END OF SECTION 01 22 00

SECTION 01 25 00**SUBSTITUTION PROCEDURES**

1.1 ACTION SUBMITTALS

A. Documentation:

1. Justification.
2. Coordination information.
3. Detailed comparison.
4. Product Data.
5. Samples.
6. Certificates and qualification data.
7. List of similar installations.
8. Material test reports.
9. Research reports.
10. Detailed comparison of Contractor's construction schedule.
11. Cost information.
12. Contractor's certification.
13. Contractor's waiver of rights to additional payment or time.

- B. Architect's Action: If necessary, Architect will request additional information within seven days of receipt of a request for substitution. Architect will notify Contractor through AAFES Project Manager of acceptance or rejection within 15 Insert number days of receipt, or ten days of receipt of additional information.

1.2 CONTRACTING OFFICERS APPROVAL

- A. The contract is based on materials and methods described in the contract document.
- B. The Contracting Officer will consider proposals for substitution of materials, equipment and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Contracting Officer to evaluate the proposed substitution.
- C. Do not substitute materials or equipment, unless such substitution has been specifically approved for this Work by the Contracting Officer.
- D. Requests for substitution must be made prior to award of Contract, in which case the bidder shall not be liable for costs of the Contracting Officers review, or at any time following award of Contract, in which case, however, the contractor shall be liable for costs of the Contracting Officer's review.
- E. Where the phrase "or equal" or "or equal as approved in advance by the Contracting Officer" occurs in the Contract Documents, do not assume that material and equipment will be approved as equal by the Contracting Officer unless the item has been specifically approved for this work by the Contracting Officer.
- F. The decision of the Contracting Officer shall be final.

1.3 SUBSTITUTIONS FOLLOWING AWARD OF CONTRACT

- A. Substitutions for Cause: Not later than 15 days prior to time required for preparation and review of submittals.
- B. Substitutions for Convenience: Not allowed.

1.4 AVAILABILITY OF SPECIFIED ITEMS

- A. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the Work.
- B. In the event specified item or items will not be so available, notify the Contracting Officer prior to receipt of bids.
- C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be back-charged as necessary and shall not be borne by AAFES,

END OF SECTION 01 25 00

SECTION 01 30 60

BACKGROUND CHECKS FOR CONTRACTOR PERSONNEL

PART 1 GENERAL

Contractor and subcontractor personnel requiring entry/access to the installation(s)/location(s) cited in the contract shall be governed by these requirements. The below requirements and procedures are prerequisites to the issuance of any government identification (i.e., pass/badge) or the registration of a privately-owned or commercial vehicle and the issuance of a pass/decal. Contractor requests for exceptions to the below requirements and procedures shall be addressed to the Contracting Officer who will obtain an approval/disapproval from the installation/ location commander who has the final authority on access issues.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

DEPARTMENT OF DEFENSE DIRECTIVE

DoDD 5200.8 (Apr 91) Security of DoD Installations and Resources

FEDERAL ACQUISITION REGULATION

1.2 FAR 52.222-3 (Jun 03) Convict Labor U.S. AIR FORCE (USAF) (4 Oct 04) Air Force Installation Security Program
AFI 31-101

AFI 31-501

(Jan 05) Personnel Security Program Management UNITED STATES CODE

50 U.S.C. 797 Internal Security Act of 1950

SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Listing of Personnel Requiring Access/Entry; G, RE The contractor shall provide a "Listing of Personnel Re-

quiring Access/Entry" to the Contracting Officer or the Contracting Officer's designee(s) as directed. The contracting officer's designee may be personnel within Security Forces, inclusive of the badge issuing activity or personnel within the organization that will be performing quality assurance functions for the contract. The listing shall be submitted on company letterhead and, as a minimum, contain the following data elements for each person:

- a. Contract number.
- b. Contract award date.
- c. Performance start and stop date(s).
- d. Work site(s) or location(s) to be accessed.
- e. Person's full name.
- f. Social Security Number (or other identification number).
- g. A statement that the social security numbers of the listed employees have been verified with the Social Security Administration (contractor's shall reference www.ssa.gov/employer/ssnv.htm).

Consent Forms

Consent forms shall authorize the Government to fingerprint contractor personnel and to conduct additional background checks that may result in identification of negative screen criteria (i.e., disqualifying factors). In general, the consent form will outline the following:

- a. The contractor has briefed the contractor personnel for the purpose of the consent form.
- b. The information on the form is collected in accordance with 50 U.S.C. 797 and DoDD 5200.8 that permits installation commanders to limit access to installations for security reasons.
- c. Completion of the form is voluntary.
- d. Agreement to provide a specimen of fingerprints, if/when requested.
- e. Awareness of a list of "disqualifying factors" and/or access to the list.
- f. Consent and authorization for the Government to conduct additional background screening and to compare fingerprints against state and federal criminal databases.
- g. Knowing and willful false statements on the form may be punished by a fine or imprisonment, or both in accordance with 10 U.S.C. 1001.
- h. That the consent form shall remain valid for not less than a 24-month period.

Criminal Background History (CBH)

The contractor shall provide the criminal background history for each employee. Background checks may be obtained from local, county or state law enforcement authorities, or commercial vendors whose checks include a criminal background history. To be considered complete, background checks shall, as a minimum, provide the following information:

- a. Individual's name.
- b. Social Security Number.
- c. Date of Birth.
- d. Address of current residence.
- e. Address of residence(s) over the past 2 years (prior to contract award).
- f. Criminal/Arrest record (felony/misdemeanor) since the 18th birthday.
- g. Information on the locality(ies) checked (i.e., local county, state, and/or federal).
- h. List of outstanding wants and warrants.

Depending upon local, county, or state regulations, the background check may be obtained by the

contractor or the contractor personnel.

"Favorable" background checks will not contain any of the following negative screening criteria (i.e., "disqualifying factors").

- a. U.S. citizenship, immigration status, or Social Security Account Number cannot be verified.
- b. Barred from entry/access to any military installation or facility.
- c. Wanted by federal or civil law enforcement authorities, regardless of offense/violation (i.e., an "order of arrest" has been issued by a judge).
- d. Conviction of a firearms or explosive violation within the past 3 years.
- e. Incarcerated for 12 months or longer within the past 3 years, regardless of offense/violation.
- f. Any conviction for espionage, sabotage, treason, terrorism, or murder.
- g. A conviction of sexual assault, armed assault/robbery, rape, child molestation, drugs possession with intent to sell, or drug distribution within the past 10 years.
- h. Name appears on any federal agency's "watch list" or "hit list" for criminal behavior or terrorist activity.

1.3 Performance Requirements

1.3.1 Performance Start Upon Contract Award or Within 9 Calendar Days After Award

If contractor performance starts immediately upon contract award or within the 9 calendar days after the contract award date (award date plus 9 calendar days), the contractor shall submit the following documentation for personnel who will begin performance within the first 10 days of the contract of the contract to the Contracting Officer or his designee.

- a. Listing of Personnel Requiring Access/Entry.
- b. Completed Consent Forms.

To obtain access for contractor personnel who will begin performance on or after calendar day 11 of the contract (subsequent to the initial 10 days of the contract), the contractor shall follow the documentation requirements outlined in the following paragraph.

1.3.2 Performance Start on or After Day 11 Following Contract Award

If the contractor's performance starts on or after calendar day 11 following the contract award date (e.g., performance begins on day 11 or later) or for contractor personnel who will begin performance on or after the 11th day of the contract, the contractor shall submit the following documentation to the Contracting Officer or his designee:

- a. Listing of Personnel Requiring Access/Entry.
- b. Completed Consent Forms.
- c. Favorable Criminal background Histories.

1.3.3 Listing of Personnel Requiring Access/Entry

The contractor shall submit a Listing of Personnel Requiring Access/Entry not later than 2 calendar days prior to performance of work on the installation as required by paragraph entitled SUBMITTALS.

No contractor personnel shall be granted or authorized entry/access until identified on the Listing of

Personnel Requiring Access/Entry.

1.3.3.1 Changes to Listing of Personnel Requiring Access/Entry Dur-

ing the performance period of the contract, the contractor shall:

- a. Provide written notification of any additions to the Listing of Personnel Requiring Entry/Access within 15 calendar days.
- b. Not later than 5 working days after a change in status for contractor personnel requiring entry/access (e.g., the personnel no longer require entry/access or the contractor becomes aware of a negative screening criteria (i.e., disqualifying factor)), the contractor shall provide written notification of deletions of personnel to the List of Personnel Requiring Access/Entry and return all Government-issued identification passes/badges and vehicle passes/decals to the Contracting Officer.

1.3.4 Consent Forms

The contractor shall submit Consent Forms not later than 2 calendar days prior to performance on the installation as required by paragraph entitled SUBMITTALS.

In general, the consent forms authorize the Government to conduct additional background checks that may result in the identifications of negative screening criteria (i.e., disqualifying factors).

1.3.4.1 Consent Forms for New Contractor/Subcontractor Personnel

During the performance period, the contractor shall provide Consent Forms for all new contractor or subcontractor personnel requiring entry/access to the installation to the Contracting Officer.

1.3.5 Criminal Background Histories (CBH)

The contractor shall submit Criminal Background Histories not later than 15 calendar days prior to performance on the installation as required by paragraph entitled SUBMITTALS.

Each background check shall be considered "current" for a 24-month period and valid for all contracts performed within the 24-month period of currency. Contractors shall ensure background checks are accomplished every 24 months to ensure no lapse in background check coverage. This requirement does not apply to contractor personnel that have a favorable government personnel security background investigation that is valid for a period longer than 2 years.

Contractor personnel who have a current, favorable government personnel security background investigation that is electronically accessible and immediately verifiable by the Government with the Joint Personnel Adjudication System (JPAS) are not required to obtain an additional background check for the purposes of complying with this requirement (i.e., existing current, favorable security background investigations may be used in lieu of these requirements).

The contractor shall maintain a copy of all background checks for a 24-month period and ensure subsequently needed background checks are accomplished prior to the expiration of a 24-month period.

1.3.5.1 Criminal Background Histories (CBH) for New Contractor/Subcontractor Personnel

During the performance period, the contractor shall provide Criminal Background Histories for all new contractor or subcontractor personnel requiring entry/access to the installation to the Contracting Officer.

1.3.6 Employee Identification

Subsequent to the contractor accomplishing the activities described in paragraphs 1.3.1 or 1.3.2 above, contractor personnel may report to the badge issuing activity and follow local installation/facility procedures to obtain identification passes/badges and vehicle passes/decals.

ernment Identification for contractor personnel to obtain entry to the installation/facility in order to request the issuance of government identification (i.e., pass/badge) or to register a privately-owned/commercial vehicle and obtain a vehicle pass/decals, the contractor personnel shall report to the installation/location entry control point and badge issuing activity with a photo identification issued by a Federal/State activity.

1.3.6.2 Requirements to Register a Vehicle

To register a privately-owned/commercial vehicle and obtain a vehicle pass/decals, contractor personnel shall provide a valid driver's license, current vehicle registration, and valid vehicle insurance certificate.

1.3.6.3 Wearing/Displaying Government-Issued ID

Contractor personnel shall follow local procedures for wearing and displaying government-issued identification passes/badges, vehicle passes/decals, and contractor-issued identification. In general, all identification passes/badges and vehicle passes/decals shall at all times be prominently worn/displayed in a visible manner to government personnel.

1.4 Unescorted Entry to Controlled or Restricted Areas

When work under this contract requires unescorted entry to controlled or restricted areas, the contractor shall comply with AFI 31-101, The Air Force Installation Security Program, and AFI 31-501, Personnel Security Program Management, as applicable.

1.5 Denial or Withdrawal of Entry/Access Privileges

If negative screening criteria is identified, the affected contractor personnel shall be denied entry/access and the Contracting Officer/designee will notify the contractor. The contractor shall be responsible for immediately returning all issued identification passes/badges and vehicle passes/decals to the Contracting Officer/designee.

Given a reasonable cause, condition, or reason, the requirements stated in this section do not circumvent an installation/location commander's unilateral authority to deny or withdraw any individual's entry/access to an installation/location.

1.6 FAR Clause 52.222-3, Convict Labor

Contractor personnel are not covered by FAR 52.222-3, Convict Labor, for the purposes of entry/access to installations/locations. Contractor personnel are covered by FAR 52.222-3 for the purposes of performance outside of installations/locations.

1.7 Subcontracts

The contractor shall insert the above requirements in any subcontract where the subcontractor will require entry/access to the installation/location(s) cited in the contract.

PART 2 PRODUCTS NOT USED.

PART 3 EXECUTION NOT USED.

END OF SECTION 01 30 60

SECTION 01 31 00**PROJECT MANAGEMENT AND COORDINATION**

1.1 REQUESTS FOR INFORMATION (RFIs)

- A. RFI Forms: Software-generated form acceptable to Architect and AAFES Project Manager.
- B. Architect's Action: Allow seven working days for Architect's response for each RFI.
- C. RFI Log: Maintain a tabular log of RFIs. Submit log weekly.

1.2 PROJECT WEB SITE

- A. Use AAFES' Project Web site for project communication and documentation.
- B. AAFES to provide up to seven Project Web site user licenses for use of , AAFES's Commissioning Authority, Contractor, Architect, and Architect's consultants. AAFES to provide eight hours of software training at Architect's office for Project Web site users.
- C. Project Web site software package:
 - 1. Autodesk, Constructware.
 - 2. Drop Box FTP Web based

1.3 PRECONSTRUCTION MEETING

- A. The Contracting Officer and/or Contracting Officer's representative will schedule and preside at preconstruction meeting.
- B. Attendance Required:
 - 1. Contracting Officers and/or Contracting Officer's representative and other Headquarters AAFES representatives.
 - 2. Local and regional AAFES representatives.
 - 3. Installation representative (Engineering, Fire Marshall, Security, etc.)
 - 4. Contractor
 - 5. Major Sub-contractors
- C. Agenda:
 - 1. Execution of Notice to Proceed.
 - 2. Distribution of Contract Documents.
 - 3. Submission of list of sub-contractors.
 - 4. Review of AAFES checklist of contract requirements.
 - 5. Discussion of Schedule.
 - 6. Discussion of critical sequencing.
 - 7. Designation of responsible personnel.

8. Processing of field decisions and change orders.
9. Submission of applications for payment.
10. Submittal of shop drawings.
11. Procedures for maintaining record documents.
12. Fire and safety procedures.
13. Security procedures.
14. Accident prevention and reports.
15. Housekeeping procedures.
16. Use of premises
 - a. Office and storage locations.
 - b. Personnel parking.
17. Major equipment deliveries.
18. Other issues pertinent to completing the contract.

- D. Meeting minutes: Minutes will be taken by the A/E and distributed to AAFES, Contractor, and Installation Engineer.

1.4 PROGRESS MEETINGS

- A. The contractor shall schedule and preside at monthly progress meetings.
- B. The contractor shall make arrangements for meetings, prepare agenda with copies for participants.
- C. Location of Meetings: Construction office, or as directed in the notice.
- D. Attendance Required:
1. Contractor's project manager.
 2. Contractor's superintendent.
 3. Major sub-contractors and suppliers.
 4. AAFES representative (AAFES' option).
- E. Agenda:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems and decisions.
 4. Identification of problems which impede planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Coordination of projected progress.
 10. Maintenance of quality and work standards.
 11. Effect of proposed changes on progress schedule and coordination.
 12. Other business relating to work.
- F. Meeting Minutes: A/E shall record meeting minutes, and distribute copies to the participants (including the AAFES Contracting Officer, within three (3) business days of the meeting.

1.5 PROJECT MEETINGS

- A. The Contractor shall schedule and preside at other project meetings when required.
- B. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and AAFES' Commissioning Authority of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. LEED requirements/Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Regulations of authorities having jurisdiction.
 - u. Testing and inspecting requirements.
 - v. Installation procedures.
 - w. Coordination with other work.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
 3. Contractor to record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- C. Coordination Meetings: At weekly intervals, in addition to specific meetings held for other purposes.

END OF SECTION 01 31 00

SECTION 01 32 00**CONSTRUCTION PROGRESS SCHEDULES**

1.1 DESCRIPTION

- A. Related Requirements Specified Elsewhere:
 - 1. Section 01 10 00 – Summary of Work.
 - 2. Section 01 31 00 – Project Management and Coordination.
 - 3. Section 01 33 00 – Submittal Procedures.
- B. Provide projected construction schedules for entire work, update monthly.

1.2 SCOPE

- A. The Contractor shall prepare a Progress Chart System to serve as a guide in managing the construction progress. Reference General Provisions clause entitled, "Schedule and Progress".

1.3 GENERAL

- A. The progress chart shall be prepared by the contractor and shall consist of a bar chart as described in this section. In preparing this system, the scheduling of construction shall be the responsibility of the contractor and shall be developed in accordance with the phasing plan shown on the construction drawings. The requirement for the system is included to assure adequate planning and execution of the work and to assist the Contracting Officer in appraising the reasonableness of the proposed schedule and evaluating progress of the work.

1.4 PROGRESS CHART SYSTEM

- A. The system consists of keeping a record of the time allotted for each activity and the actual progress of the activity.
- B. Activities shall be listed vertically and shall include the units of work required for the project.
- C. All activities of AAFES which affect progress and Contract required dates for completion shall be shown. Include activities for AAFES FURNISHED/AAFES INSTALLED ITEMS.
- D. The selection and number of activities shall be subject to the Contracting Officer's approval.

1.5 A SCALE OF TIME

- A. A scale of time, from date of the beginning of the contract work to the date of completion of the contract work, shall be indicated horizontally on the chart. The units of time indicated shall be days.

1.6 ACTIVITY TIMES

- A. Activity shall be indicated in the form of scaled time bars. The bars shall indicate the following:
1. The schedule of time allotted for the activity.
 2. The actual progress of the activity including the actual time of the activity start, the time spent to date or to the finish of the activity.

1.7 SUBMISSION AND APPROVAL

- A. Submission and approval of the system shall be as follows:
1. A preliminary bar chart defining the contractor's planned operations during the first sixty (60) calendar days after notice to proceed shall be submitted within ten (10) days. The Contractor's general approach for the balance of the project shall be indicated. Cost of the activities expected to be completed or partially completed before submission and approval of the complete bar chart should be included.

1.8 THE COMPLETE BAR CHART

- A. The complete bar chart shall be submitted within thirty (30) calendar days after receipt of notice to proceed.

1.9 CONTRACTOR

- A. The Contractor shall submit at intervals of thirty (30) calendar days a copy of the complete bar chart with the current activity progress clearly indicated. Cost of each activity completed and each partially completed shall be included.
- B. The contractor shall also submit a narrative report with the updated bar chart, including a description of problem areas current and anticipated) delaying factors and their impact, and an explanation of corrective actions taken or proposed.

END OF SECTION 01 32 00

SECTION 01 33 00**SUBMITTAL PROCEDURES**

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Shop Drawings.
- D. Samples.
- E. Product Data.
- F. Certificates.

1.2 RELATED SECTIONS

- A. Section 01 10 00 - Summary of Project.
- B. Section 01 32 00 – Construction Progress Documentation
- C. Section 01 77 00 – Closeout Procedures.
- D. Section 01 78 39 - Project Record Documents.

1.3 SUBMITTAL PROCEDURES

- A. Electronic copies of digital data files of the Contract Drawings will not be provided by Architect for Contractor's use.
- B. Processing Time:
 - 1. Initial Review: 15 days.
 - 2. Resubmittal Review: 15 days.
 - 3. Sequential Review: 21 days.
 - 4. Concurrent Consultant Review: 15 days.
- C. Electronic Submittal:
 - 1. Post as PDF files directly to Architect's FTP site.
 - 2. Submit via email as PDF files.
- D. Contractor's Review:
 - 1. Submittals: Marked with approval stamp before submitting to the Contracting Officer.
- E. Transmit each submittal with AAFES Form 4450-48.
- F. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

- G. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.
 - H. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
 - I. Schedule submittals to expedite the Project, and in accordance with the List of Required Submittals in this section. Transmit submittals to Contracting Officer. Coordinate submission of related items.
 - J. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work. Failure to identify such variations will not relieve the Contractor of the responsibility for completing the work in full accordance with the Contract Documents even though such submittals are approved by the Contracting Officer.
 - K. Prior to approval of the material/product submitted, the contractor shall include with the submittal a written certification that the material/product contains no asbestos. This certificate is mandatory before approval will be issued.
 - L. Provide space for Contractor and Contracting Officer review stamps.
 - M. When revised for resubmission, identify all changes made since previous submission.
 - N. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- 1.4 CONSTRUCTION PROGRESS SCHEDULES
- A. Submit preliminary Progress Schedule within ten (10) days of the Notice to Proceed.
 - B. Submit complete (final) Progress Schedule within thirty (30) days of the Notice to Proceed.
 - C. Submit monthly revisions of Progress Schedule.
 - D. Refer to Section 01 32 00 – Construction Progress Documentation.
- 1.5 SHOP DRAWINGS
- A. Shop Drawings For Review:
 - 1. Submitted to Contracting Officer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
 - 2. Shop drawings shall be prepared by a qualified detailer.
 - 3. Minimum sheet size for shop drawings shall be 8 1/2" x 11".
 - 4. After review, and distribute copies in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 70 00 - Project Closeout.
 - B. Shop Drawings For Project Close-out:
 - 1. Submitted for the AAFES' benefit during and after project completion.

- C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 - 1. Submit the number of opaque reproductions which Contractor requires, plus three (four on structural, mechanical, and electrical submittals) copies which will be retained by Contracting Officer.

1.6 SAMPLES

A. Samples For Review:

- 1. Submitted to Contracting Officer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- 2. After review, produce duplicates and distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 70 00 - Project Closeout.

B. Samples For Information:

- 1. Submitted for the Contracting Officer's knowledge as project administrator or for AAFES.

C. Samples For Selection:

- 1. Submitted to Contracting Officer for aesthetic, color, or finish selection.
- 2. Submit samples of finishes from the full range of manufacturers' standard colors, or in custom colors (if so stated in the product specification section), textures, and patterns for Contracting Officer selection.
- 3. After review, distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 - Project Closeout.

D. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

E. Include identification on each sample, with full Project information.

F. Submit the number of samples specified in individual specification sections; two of which will be retained by Contracting Officer.

G. Reviewed samples which may be used in the Work are indicated in individual specification sections.

H. Coordinate sample submittals with respective shop drawings.

1.7 PRODUCT DATA

- A. Submit Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, specifications, illustrations, and other descriptive data.
- B. Product data that relates to shop drawings or samples must be submitted with the respective shop drawings or samples.

1.8 CERTIFICATES

- A. Delegated-Design Services Certification: In addition to other required submittals, submit a certificate, signed and sealed by the responsible design professional.
- B. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Contracting Officer, in quantities specified for Product Data.
- C. Certify that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, test results, affidavits, and/or certifications as appropriate.
- D. Certificates may be recent or previous test results on material or Product, but must be acceptable to Contracting Officer/Engineer.

END OF SECTION 01 33 00

SECTION 01 33 10**WEATHER TABLE****PART 1 - GENERAL**

1.1 INFORMATION AND DATA

- A. Information and data furnished or referred to in the weather table is furnished for the Contractor's information.

1.2 CONTRACT TIME LIMITS

- B. The contract time limits include weather conditions that are shown in the table listed herein.

1.3 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

- A. This provision specifies the procedure for the determination of time extensions for unusually severe weather affecting exterior work in accordance with the Contract. The following listing defines the monthly anticipated adverse weather for the contract period and is based on NOAA data for the geographic location of the project.

- B. Weather Table:

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS
Sheppard AFB; Wichita Falls, TX

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
5	5	6	7	9	7	5	6	6	6	5	5

This listing of anticipated adverse weather will constitute the base line monthly weather time evaluations. Throughout the contract each month, actual adverse weather days will be recorded on a calendar basis (including weekends and holidays) and compared to the monthly anticipated adverse weather in this listing. The term "actual adverse weather days" shall include days impacted by actual adverse weather. The number of actual adverse weather days affecting exterior work shall be calculated chronologically from the first to the last day in each month. Adverse weather days must prevent work for 50 percent or more of the contractor's work day and delay work critical to the timely completion of the project. If the number of actual adverse weather days exceeds the number of days anticipated in the above listing, the Contractor may submit in writing to the Contracting Officer a request for a time extension within 30 days of the adverse weather. Based upon the above NOAA data the Contracting Officer will determine if the time extension for the Contractor is warranted. The Contracting Officer will then convert any qualifying delays to calendar days and issue a modification in accordance with the contract. **Any Time extensions granted under this provision will be at no cost to AAFES.**

PART 2 – PRODUCTS – NOT USED**PART 3 – EXECUTION – NOT USED**

END OF SECTION 01 33 10

SECTION 01 35 43**ENVIRONMENTAL PROTECTION****PART 1 - GENERAL****1.1 SECTION INCLUDES (Scope)**

- A. The work covered by this section consists of furnishing all labor, materials, and equipment and performing all work required for the prevention of environmental degradation during and as a result of construction operations under this contract. These requirements are in addition to any environmental protection requirements elsewhere in these specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents, not naturally occurring at the site, which adversely affect human health or welfare; unfavorably alter ecological balances important to human life; affect other species of importance to humans; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution by the contractor requires consideration of air, water, and land, and involves noise control, solid waste management and management of radiant energy and radioactive materials, as well as other pollutants. This section also requires the protection of cultural and historic resources.
- B. Contractor shall coordinate the work of this section with the work called for under the various Earthwork and Utilities sections.

1.2 CONTRACTOR'S GENERAL ENVIRONMENTAL COMPLIANCE OBLIGATIONS.

Work under this contract is to be performed on a government facility. All environmental rules applying to contractor operations elsewhere will also apply on the government facility. Contractor (and any subcontractor, agent or representative) shall comply with all Applicable Federal, State, and local laws and regulations providing for environmental protection and pollution control and abatement. These include but are not limited to: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act, Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, Safe Drinking Water Act, Emergency Planning and Community Right-to-Know Act, Oil Pollution Act, Archeological Resources Protection Act, and Pollution Prevention Act. Contractor has the duty to determine for itself where such laws and regulations apply. Although the Contractor may request assistance from the Contracting Officer in delineating applicable environmental laws and regulations, Contractor has an independent responsibility to make its own determination and to do so in a timely fashion.

1.3 FINES OR PENALTIES FOR ENVIRONMENTAL NON-COMPLIANCE.

The Contractor shall be responsible for paying any fines or penalties assessed against AAFES or the installation or the Army or the Air Force for violations of environmental laws or regulations resulting from acts or omissions of the contractor or its employees, subcontractors, or agents. This obligation is in addition to any fines or penalties that may be assessed against the contractor for the same conduct. Contractor may either reimburse these fines or penalties through the Contracting Officer, or with the consent of the Contracting Officer, the Contractor may pay such fines or penalties directly to the regulatory agency or agencies concerned.

1.4 CONTRACTOR'S LIABILITY FOR ENVIRONMENTAL DAMAGES

Contractor agrees to hold harmless and indemnify AAFES (which includes the Army, Air Force, or other Department of Defense component, as appropriate) for any and all damages of any kind resulting from environmentally harmful activities by the contractor, contractor's employees or agents or subcontractors. "Damages" includes but is not limited to personal injury, property damage (including diminution of value), or death, environmental restoration and response costs, natural resource damages, expert witness and attorney's fees, and reimbursement of any and all expenses incurred to obtain permits as a result of Contractor's failure to identify or obtain permits for itself or AAFES.

1.5 CONTACTS WITH ENVIRONMENTAL REGULATORY OFFICIALS.

Contractor shall immediately advise the Contracting Officer and the installation environmental office of the content of all contacts with federal, state, or local environmental regulators, before, during, and after the performance of this contract concerning the performance of this contract.

PART 2 - PERMITS

2.1 PERMITS FOR EQUIPMENT USED BY CONTRACTOR IN PERFORMING AAFES CONTRACTS.

For equipment used in the performance of this contract, Contractor shall obtain in Contractor's name and at no additional expense to AAFES, all permits, coordinations, certifications or other regulatory authorization necessary to perform and complete the work required by this contract under applicable environmental laws and regulations. "Applicable environmental laws and regulations" includes but is not limited to: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, Safe Drinking Water Act, Emergency Planning and Community Right-to-Know Act, Oil Pollution Act, and Pollution Prevention Act and State, County, and Local laws and regulations on the same subjects.

2.2 PERMITS NEEDED FOR CONSTRUCTION, EXCAVATION, MODIFICATION, RENOVATION, DEMOLITION, INSTALLATION, OR OTHER ALTERATION OF BUILDINGS, STRUCTURES, EQUIPMENT, INSTALLATIONS, REAL PROPERTY OR SYSTEMS

Contractor shall identify all Federal, State, County, or local, permits, coordinations, certifications or other regulatory authorization requirements under all applicable environmental laws and regulations as defined in (a.) above. Contractor shall then prepare and submit in draft all applicable permit applications, coordinations, notices, or other required filings, together with all supporting data to the contracting officer for review. Permit applications or notifications or other documents that must be submitted by AAFES will be submitted by AAFES, and any documents that must be submitted by the contractor will be returned after review to the contractor for submission. No work requiring permit or other written authorization shall proceed before the Contractor has the permit or authorization or a copy thereof in its possession.

PART 3 - MATERIALS**3.1 RECYCLED MATERIALS.**

Materials used in this contract shall be, to the greatest extent practicable and consistent with financial prudence, made of recycled materials or of materials that are recyclable. Where construction debris such as concrete or asphalt or wood can be recycled, this alternative will be considered.

3.2 ASBESTOS

Asbestos will not be used or included in this project.

3.3 POLYCHLORINATED BIPHENYL'S (PCBs)

PCBs will not be used or included in this project.

3.4 LEAD-BASED PAINT

Lead-based paint will not be used included in this project.

3.5 OZONE-DEPLETING SUBSTANCES.

- A. "Class I substance," as used in this clause, means any substance designated as class I by the Environmental Protection Agency (EPA)(40 CFR Part 82), including but not limited to chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform.
- B. "Class II substance," as used in this clause, means any substance designated as class II by EPA (40 CFR Part 82), including but not limited to, hydrochlorofluorocarbons.
- C. As required by 42 USC 7671j(b), c, and (d) and 40 CFR Part 82, Subpart E, the Contractor shall label products which contain class I or class II ozone-depleting substances or are manufactured with a process that uses class I or class II ozone-depleting substances, or containers of class I or class II ozone-depleting substances, as follows:

"WARNING: Contains (or manufactured with, if applicable)
_____*, (a) substance(s) which harm(s)public health
and the environment by destroying ozone in the upper atmosphere."

*The Contractor shall insert the name of the substance(s).

- D. The contractor shall comply with the applicable requirements of Sections 608 and 609 of the Clean Air Act (42 USC 7671g, National Recycling and Emission Reduction Program and 7671h, Servicing of Motor Vehicle Air Conditioners) as each or both apply to the contract.

3.6 PESTICIDES

Except as may be specified elsewhere in this contract, Contractor will not use or apply pesticides (such as herbicides or weed-killers, insecticides, or rodenticides) without the specific written prior approval of the Contracting Officer.

PART 4 - EXECUTION (WORK PRACTICES)**4.1 GENERAL: SITE DISTURBANCE DURING CONSTRUCTION ACTIVITIES.**

Contractor shall use industry-recognized best management practices to avoid creation of fugitive dust emissions and to avoid and control storm water runoff from the construction site and any temporary roads that may be used for access to it. Water sprinkling may be used to control dust. Contractor shall perform all work under this contract in such a manner that no pollutants of any kind are released into ditches, storm drains, streams, lakes, or other surface waters on or connected to the site.

4.2 PROTECTION OF WATER RESOURCES

- A. General: The General Contractor shall not pollute storm drainage, streams, lakes, or reservoirs with fuels, oils, bitumens, calcium chloride, acids, construction wastes or other harmful materials or pollutants. It is the responsibility of the General Contractor to determine and comply with all applicable federal, state, regional, municipal, and other regulations.
- B. Spillage: The General Contractor shall take special measures to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides, cement, and surface drainage from entering public waters. In the event of a spill, the contractor must make all required notifications to federal, state or local authorities and will notify the Contracting Officer immediately.
- C. Washing and Curing Water: Water used in aggregate processing, concrete curing, foundation, and concrete lift clean-up and other waste water shall not be allowed to enter the storm drainage system.

4.3 PROTECTION OF LAND RESOURCES

- A. General: It is intended that the land resources within the project boundaries and outside the limits of permanent work performed under this contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to the natural and not detract from the appearance of the project. The General Contractor shall limit his construction activities to areas defined by the Drawings or Specifications.
- B. Prevention of Landscape Defacement: Except in areas marked on the plans to be cleared, the General Contractor shall not deface, remove, cut, injure or destroy trees or shrubs without specific written authority. Trees designated to be saved shall be protected from either excavation or filling within the root zone. No ropes, cables, or guys shall be fastened or attached to any existing trees for anchorage unless specifically authorized by the Contracting Officer. The General Contractor shall in any event be responsible for any damage resulting from such use.
- C. Restoration of Landscape Damage: Any trees or other landscape features scarred or damaged by the General Contractor's equipment or operations shall be restored as nearly as possible to the original condition at the General Contractor's expense. The Contracting Officer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of under requirements for clearing and grubbing (Section 31 10 00). All scars made on trees not designated on the plans to be removed by equipment construction operations, or by the removal of limbs larger than 1-inch in diameter shall be coated immediately with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced landscape personnel. Tree trimming with axes shall not be permitted. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the General Contractor and are beyond

saving in the opinion of the Contracting Officer, shall be immediately removed and replaced with a nursery-grown tree of the same species.

4.4 CONTROL OF AIR EMISSIONS.

Contractor's actions shall conform to all federal, state, and local requirements for the control of air emissions during work under this contract. Trucks leaving the site will be brushed or washed to remove all practicable amounts of dust or other material that may become airborne. Contractor will ensure that all internal construction vehicles and equipment used will have the lowest practicable emissions characteristics and be maintained in optimum operating condition for the reduction of air emissions. Where use of electric motors instead of internal combustion engines is feasible, electric motors will be used during construction.

PART 5 – POLLUTION PREVENTION AND WASTE DISPOSAL

5.1 POLLUTION PREVENTION

The contractor should use prior planning to find those materials that will minimize the creation of waste in general and hazardous waste in particular. Recycling should be considered and implemented at every practicable stage of the project.

5.2 WASTE DISPOSAL

- A. Pollution Prevention: The contractor should use prior planning to find those materials and work practices that will minimize the creation of waste in general and hazardous waste in particular.
- B. Hazardous Waste Generation, Handling, and Disposal. Work done under this contract is to be performed on a government facility. According to rules and procedures of the United States Environmental Protection Agency, the federal facility is required to have a generator identification number under the Resource Conservation and Recovery Act (RCRA) and to be responsible for wastes (as defined under RCRA) produced, managed, stored, disposed on, or transported from the facility. Accordingly, Contractor will, to the greatest extent practicable, use materials, processes, and techniques that will avoid the creation of hazardous waste. Contractor shall prepare and follow a written waste management and disposal plan for all hazardous wastes generated on the site. Prior to generation of any hazardous wastes, contractor will coordinate planned activities regarding hazardous materials and hazardous waste with the Contracting Officer. Contractor shall submit a written waste management plan, through the contracting officer, to installation environmental office. Contractor shall follow this plan once it has been approved by the contracting officer. Under no circumstances will contractor bring onto the site hazardous waste that has been generated elsewhere. All hazardous waste will be properly disposed of by the Contractor in accordance with all federal, state, and local requirements.
- C. Disposal of Non-RCRA Wastes.
All non-hazardous wastes generated on the site as a result of this contract must be disposed of properly, in accordance with all federal, state and local requirements. Materials will be recycled whenever practicable. Prior to creation of such wastes, the contractor shall submit to the installation environmental management function, through the Contracting Officer, a plan for disposal of wastes. Such plan shall include the types of waste to be created, how they shall be stored, managed and disposed. Contractor shall follow this plan once it has been approved by the installation and contracting officer. Such wastes will not be created until approved by the Contracting Officer.

D. Construction Debris.

1. Debris from demolition of existing structures will ordinarily be removed to a location on the installation, as designated by the installation authorities.
2. If a location on the installation is not available, other sections in this contract may require the contractor to remove clean construction debris from the site to a location of the contractor's choosing off the installation. (Site soil or other site media are not covered by this paragraph.) Debris will be recycled or disposed of in accordance with all applicable federal, state and local rules. Such debris must be free of all contamination, including but not limited to, lead paint, asbestos, and insecticides. Prior to removal of any construction debris, that debris must be certified by the installation to be free of contamination and of no value to the United States, and this certification must be provided to the contracting officer. To expedite work, this may be accomplished by a telecopier or other suitable electronic means, however, the original certification form must be provided to the contracting officer. No form is prescribed for this certification so long as all necessary information is provided and the document is signed by an authorized installation representative. However, an example is provided at **page 7** and this form may be used. All construction debris removed from the installation must be covered by a certification. The contractor must arrange with the installation POC whether all debris will be covered by one certification or if several certifications will be required.

E. Consolidated Waste Disposal Plans: Contractor may, at contractor's option, submit for approval as specified above one consolidated plan for handling hazardous and non-hazardous wastes.

F. Earthwork and Removal of Potentially Contaminated Media:

1. Unless otherwise specified elsewhere in this contract, the site has been inspected and is, consistent with best professional judgment, free of environmental contamination or pollution. However, work under this contract will be performed on a military installation, where the history of prior military and industrial activities is not necessarily completely known. The following provisions prohibit the removal from the installation of soil or other materials found on site and are included, in an abundance of caution, for the protection of AAFES, the installation, and the contractor.
2. Notwithstanding any other clause in this contract, including but not limited to all standard site work general provisions (02010-02900); no media by-product resulting from site preparation, construction or excavation shall be moved off the post, base, or installation where the construction is occurring. If the construction is off the post, base or installation, no media by-product shall be moved off the construction site.
3. The contractor shall: (1) leave the media in place at the site, subject to appropriate erosion control; or (2) haul the media to and place it at a location on the installation that has been designated either in this contract or in writing by the contracting officer; and (3) if unforeseen difficulties arise, such as excessive quantity of media is generated, the contractor shall advise the contracting officer and shall not remove media from the site without written authorization from the contracting officer.

DEFINITIONS

Media - Any soil, water, or air, moved, disturbed or released from a site.

The terms hazardous, waste, pollutant, contaminate, substance have the same meanings and usage here as they commonly do in CERCLA, RCRA, FWPCA, CAA, TSCA, and SDWA respectively."

INSTALLATION CERTIFICATION FOR CLEAN CONSTRUCTION DEBRIS TO BE REMOVED FROM
AAFES PROJECT SITE

As representative of _____ (insert name of installation), I am authorized to certify,
and hereby do so certify, that the construction debris to be removed from the AAFES project
site at _____
_____ (describe
project and list address, for example Main Exchange Project, 111 Road A, X installation) has
been inspected and is of no value to the United States and is free of all contamination,
including but not limited to: lead paint, asbestos, PCBs, and pesticides.

CERTIFICATION:

Signed: _____ Date: _____

Printed Name, Rank or Grade, and Duty Title:

ORIGINAL OF THIS FORM MUST BE PROVIDED TO CONTRACTING OFFICER

PART 6 - UNEXPECTED SITE CONDITIONS

6.1 CONTAMINATED SOIL OR GROUNDWATER.

Unless otherwise specified elsewhere in this contract, site has been inspected and is,
consistent with best professional judgment, free of environmental contamination or pollution.
However, unexpected conditions can always arise. Contractor or subcontractor personnel may
encounter soil or groundwater that is suspected to be contaminated, either because of odors,
colors, free liquids, unexpected construction debris, or other suspicious conditions. Should this
occur, contractor will immediately notify the Contracting Officer and the installation
environmental office and take necessary initial measures to protect workers, the site, and other
personnel.

6.2 UNEXPECTED ARTIFACTS OR RELICS

Should contractor employees in the course of site preparation or other work on this contract
find unexpected historic or archeological remains, such as bones, arrow points, pottery
remnants, foundations, or other evidence of previous uses of the site, contractor will cease
further site-disturbing activity and immediately notify the Contracting Officer and installation
environmental office.

END OF SECTION 01 35 43

SECTION 01 40 00**QUALITY REQUIREMENTS****PART 1 - GENERAL****1.1 REQUIREMENTS INCLUDED**

- A. The Contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of his subcontractor(s) to insure conformation to applicable specifications and drawings with respect to the materials, workmanship, construction, finish and functional performance. Tests of materials and/or special inspections will be made, when required by these specifications, by applicable law, rules and regulations in accordance with respective Sections of the specifications. Where required, the Contractor shall employ and pay for the services of an independent agency to perform specific services and testing. Examples of such services are tests of fill materials, concrete materials, concrete mix design, asphalt concrete laboratory testing of materials proposed and calculations for asphalt concrete mixtures, etc.
- B. The Contractor shall arrange and pay for all services and testing which are not specifically indicated to be provided by AAFES.
- C. If a material is not required to be field tested, the Contracting Officer may require the supplier to furnish with each delivery of such material, a certificate bearing legal signature of said supplier, stating that such material complies with specification requirements.
- D. If any work or material requiring tests and inspections is executed, enclosed or covered before tests are made, or test reports distributed, then the Contractor shall, at his own expense, uncover such part of this work or material and keep it uncovered until such tests and inspections have been made and test reports distributed. If work or material so tested and inspected shall not be found to conform to the requirements of the Construction Documents, it shall be deemed and construed to be defective materials or faulty workmanship and the Contractor, at his own expense, shall replace work or material removed and repair all work disturbed thereby.

1.2 AAFES RESPONSIBILITY

- A. AAFES will employ and pay for the services of an Independent Testing Agency to perform specified quality control testing during construction indicated in the following sections:
 - 1. Testing Adjusting and Balancing for HVAC: Section 23 00 72.

1.3 CONTRACTORS RESPONSIBILITY

- A. Cooperate with the Contracting Officer and laboratory personnel and provide access to work and to manufacturer's operations. Provide samples of materials to be tested, in required quantities. Furnish casual labor and facilities required to provide access to work to be tested; to obtain and handle samples at the site; to facilitate inspections and tests; and for laboratory's exclusive use for storage and curing of test samples. Notify laboratory sufficiently in advance of operations to allow for its assignment of personnel and scheduling of tests.
- B. The use of AAFES' or Contractor's independent testing services shall in no way relieve the Contractor of his responsibility to furnish materials and construction in full compliance with the plans and specifications.
- C. The Contractor shall coordinate with both AAFES and his own testing laboratories so that the work will be inspected and tested according to contract requirements. This coordinately includes notification of when tests should be taken, easy access to the work, and general cooperation in every way to insure proper control of the work.
- D. Upon completion of the project the Contractor shall submit a signed certificate stating tests for this work were made in accordance with provisions of these specifications and, further, all such tests and reports made were reported as required. This certificate shall list all tests and dates when work was completed.

1.4 AGENCY RESPONSIBILITIES

- A. Test samples of mixes submitted by Contractor.
- B. Provide qualified personnel at site. Cooperate with Contracting Officer and Contractor in performance of services.
- C. Perform specified sampling and testing of Products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Contracting Officer, and Contractor of observed irregularities or non-conformance of Work or Products.
- F. Perform additional tests required by Contracting Officer.
- G. Provide Contracting Officer with three (3) copies of each written test report, and the Contractor each with one copy of each test report. Each report shall include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing Laboratory name, address and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling or inspection.
 - 6. Record of temperature.
 - 7. Date of test.
 - 8. Identification of product and specification section.
 - 9. Location of sample or test in the project.
 - 10. Type of inspection or test.
 - 11. Results of tests and compliance with Contract Documents.
 - 12. Interpretation of test results, when requested by the Contracting Officer.

- H. Upon completion of the project, the testing agency shall prepare a certificate, certified in the presence of a Notary Public, stating testing for this work was conducted in accordance with the provisions of these specifications, and further, all tests and reports were provided for this job were reported as required.

1.5 LIMITS ON TESTING AUTHORITY

- A. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Agency or laboratory may not approve or accept any portion of the Work.
- C. Agency or laboratory may not assume any duties of Contractor.
- D. Agency or laboratory has no authority to stop the Work.

1.6 RELATED REQUIREMENTS

- A. Required Submittals Section 01 33 00.
- B. Related requirements and tests specified in Division 2 through 33.

END OF SECTION 01 40 00

SECTION 01 55 00**TEMPORARY FACILITIES, BARRIERS AND CONTROLS****PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Section includes requirements for support and protection facilities.
- B. Related Sections:
1. Division 1 Section "Summary" for limitations on work restrictions and utility interruptions.
 2. Division 2 Section "Selective Demolition" for removal of selected portions of a building or structure.
 3. Division 3 Section "Polished Concrete Floor Finish" for the installation of a polished concrete floor system for new or existing concrete floors.
 4. Division 3 Section "Interior Concrete Slab Repairs and Joint Filler Replacement" for existing concrete floor slab preparation prior to the installation of a polished concrete floor finish.
 5. Division 6 Section "Rough Carpentry" for plywood sheathing.
 6. Division 8 Section "Flush Wood Doors" for temporary doors.
 7. Division 8 Section "Door Hardware" for temporary door hardware.
 8. Division 9 Section "Non-Load-Bearing Steel Framing" for metal stud framing system.
 9. Division 9 Section "Gypsum Board" for gypsum board and fire taping.

1.3 INFORMATIONAL SUBMITTALS

- A. Dust-Control and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust-control and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
1. Locations of dust-control partitions at each phase of the work.
 2. HVAC system isolation schematic drawing.
 3. Location of proposed air filtration system discharge.
 4. Other dust-control measures.
 5. Waste management plan.

1.4 QUALITY ASSURANCE

- A. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Polyethylene Sheet: Reinforced, fire-resistive sheet, 6 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.
- B. Dust Barrier Tape: Pressure sensitive tape of type recommended by polyethylene sheet manufacturer for sealing joints and penetrations.
- C. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).
- D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- E. Spring-Loaded Poles, Ceiling/Wall Rails and Side Wall Clamps: Zipwall Barrier Products for fast set-up and break-down dust barrier system that consists of spring-loaded support poles that extend from 4 feet 7 inches to 12 feet that hold plastic sheeting in position as a curtain-barrier. Zipwall, 37 Broadway, Arlington MA 02474. Phone: 1-800-718-2255, website: www.zipwall.com. Also available are longer poles that adjust from 6 foot 9 inches to approximately 21 feet with spring loaded jacks.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Until Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 3. Permanent HVAC System: Not allowed in areas where Polished Concrete Floor Finish operations are in progress.
- C. Air Filtration Units: HEPA primary and secondary filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 1 Section "Summary."

- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Maintain support facilities until Contracting Officer schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- E. Waste Disposal Facilities: Comply with requirements specified in Division 1 Section "Safety Regulations and Codes" and "Waste Disposal."
- F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As indicated on Drawings.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- B. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- D. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

- E. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.
1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- G. Temporary Barriers: Provide floor-to-ceiling dustproof barriers to limit dust and dirt migration and to separate areas occupied by AAFES and tenants from fumes and noise.
1. Dust Barrier: Where dust barriers are required, provide a single layer of 6 mil fire resistant clear polyethylene fiberglass reinforced sheet as manufactured by Griffolyn, or equal. Tape all joints and provide fire resistive treated 2 x 4 wood or metal stud top and bottom runners and verticals 4 foot o.c. with polyethylene sheet wrapped and taped to the runners.
 - a. Contractor Option: Zipwall temporary barrier system.
 - b. Seal Joints and Perimeter: Equip partitions with gasketed dustproof doors and security locks where openings are required. Where practical, locate doors in or towards back of house areas to avoid tracking dust in areas open to the public.
 2. Opaque Dust Barrier: Where dust barriers are required and where indicated for long duration separation of construction operations from AAFES and tenant spaces, provide braced metal stud framing covered on construction side with 6 mil fire resistant clear polyethylene fiberglass reinforced sheet as manufactured by Griffolyn, or equal. Tape all joints and perimeter. Provide ½ inch gypsum board, fire taped on the AAFES/tenant side from floor to ceiling. Provide R-11 batt insulation for thermal separation from unconditioned construction areas and noise reduction adjacent to sales, food service or office areas.
 - a. Seal Joints and Perimeter: Equip partitions with gasketed dustproof doors and security locks where openings are required. Where practical, locate doors in or towards back of house areas to avoid tracking dust in areas open to the public.
 3. Security Weather-tight Barrier: Where a secure weather-tight barrier is required and where a temporary exit enclosure through surrounding and overhead construction is indicated, provide braced metal stud framing covered on construction side with ½ inch plywood. Provide ½ inch gypsum board, fire-taped on the AAFES/public side on entire enclosure. Provide R-11 batt insulation for thermal separation from the exterior, unconditioned construction areas and noise reduction adjacent to sales, food service or office areas. Panelize framing for ease of removal and relocation.

- a. Construct vestibule at each access through the barrier with 1-3/4 inch solid core wood doors with 3/4" wood frames spaced not less than 6 feet apart. Doors shall be hinged with latches and provided with double high security padlocks in accordance with AAFES security. Maintain water dampened or adhesive surfaced foot mats in vestibules.
 - b. At temporary exits, provide individual 1-3/4 inch solid core wood doors with 3/4 inch wood frames at each end of the enclosure swinging in the direction of exit. Provide hinges, exit devices and closers. Exit devices to always be operable in the direction of exiting and locked on the opposite side.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Prohibit smoking in construction areas.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.4 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48hours are considered defective.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION 01 55 00

SECTION 01 58 00

CONSTRUCTION SITE SIGN

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Construction site sign.
- B. Maintenance.
- C. Removal.

1.2 RELATED SECTIONS

- A. Section 01 10 00 - Summary.
- B. Section 01 59 00 - Field Offices and Sheds.

1.3 QUALITY ASSURANCE

- A. Design sign and structure to withstand 60 miles/hr (100 km/hr) wind velocity.
- B. Sign Painter: Experienced as a professional sign painter for minimum three years.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.4 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures: Shop drawings.
- B. Show content, layout, lettering, color, structure, sizes, and grades of members.

PART 2 - PRODUCTS

2.1 SIGN MATERIALS

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch (19 mm) thick, 48 inches x 96 inches.
- C. Rough Hardware: Galvanized.
- D. Paint and Primers: Exterior quality, two coats; sign background of color as indicated on the drawing.
- E. Lettering: Exterior quality paint, colors as indicated on the drawing.

2.2 CONSTRUCTION SITE SIGN

- A. One painted project sign of construction, design, and content shown on the next page, location shown on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install construction site sign within 30 days after Notice to Proceed.
- B. Erect at designated location.
- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.
- E. Paint exposed surfaces of sign, supports, and framing.

3.2 MAINTENANCE

- A. Maintain signs and supports clean, repair deterioration and damage.

3.3 REMOVAL

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION 01 58 00



Alternate

SECTION 01 59 00

FIELD OFFICES AND SHEDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary field offices and sheds.
- B. Maintenance and cleaning.
- C. Removal.

1.2 RELATED SECTIONS

- A. Section 01 10 00 - Summary.
- B. Section 01 50 10 - Temporary Utilities.

PART 2 - PRODUCTS

2.1 MATERIALS, EQUIPMENT, FURNISHINGS

- A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.2 CONSTRUCTION

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove at completion of Work.
- C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
- D. Exterior Materials: Weather resistant, finished in one color acceptable to Contracting Officer.
- E. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.
- F. Lighting for Offices: 50 ft-C (538 lx) at desk top height, exterior lighting at entrance doors.
- G. Fire Extinguishers: One 10# standard dry chemical (ABC) type fire extinguisher at each office and each storage area.
- H. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

2.3 ENVIRONMENTAL CONTROL

- A. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain 68 degrees F (20 degrees C) heating and 76 degrees F (23 degrees C) cooling.
- B. Storage Spaces: Heating and ventilation as needed to maintain Products in accordance with Contract Documents; adequate lighting for maintenance and inspection of Products.

2.4 CONTRACTOR OFFICE AND FACILITIES

- A. Size: For Contractor's needs and to provide space for project meetings. Minimum size: 150 square feet.
- B. Telephone: The Contractor shall install, maintain and pay for telephone service for the Contractor's field office including an answering device and outside bell.
- C. Internet, E-Mail and Fax: Install, maintain and pay for services for the Contractor's Field Office.
- D. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- E. Other Furnishings: Contractor's option.
- F. Equipment: Six (6) adjustable band protective helmets for visitors, one 10 inch (250 mm) outdoor weather thermometer and a weather protected bulletin board for posting information required by the contract.

2.5 CONTRACTING OFFICER'S FIELD OFFICE

- A. Separate space for sole use by the AAFES Contracting Officer, with separate entrance door with new lock and two keys.
- B. Area: Minimum 150 sq ft (14 sq m), minimum dimension 8 ft (2.4 m).
- C. Windows: Minimum three minimum total area of 10 percent of floor area, with operable sash and insect screens. Locate to provide views of construction area.
- D. Electrical Distribution Panel: Two circuits minimum, 110 volt, single phase service.
- E. Minimum four 110 volt duplex convenience outlets, one on each wall.
- F. Telephone: The Contractor shall install, maintain and pay for telephone service to the Contracting Officer's field office, including an answering device. The Contractor shall pay for basic service and local calls only, but will not pay for long distance calls.
- G. Furnishings:
 - 1. One desk 54 x 30 inch (1.4 x 0.75 m), with three drawers.
 - 2. One drafting table 36 x 72 inch (one x 1.8 m), with one equipment drawer.
 - 3. Plan rack to hold working Drawings, shop drawings, and record documents.
 - 4. One standard four-drawer legal size metal filing cabinet with locks and two keys per lock.
 - 5. Six linear ft (2 m) of metal bookshelves.

6. Two swivel arm chairs.
7. Two straight chairs.
8. One drafting table stool.

9. One tackboard 36 x 30 inch (1 x 0.75 m).
10. One waste basket per desk and table.

2.6 STORAGE AREAS AND SHEDS

- A. Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.2 INSTALLATION

- A. Install office spaces ready for occupancy 15 days after date of Notice to Proceed.
- B. Employee Residential Occupancy: Not permitted on Installation property.

3.3 MAINTENANCE AND CLEANING

- A. Weekly cleaning services for offices; periodic cleaning and maintenance for office and storage areas.
- B. Maintain approach walks free of mud, water, and snow.

3.4 REMOVAL

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION 01 59 00

SECTION 01 65 00

STARTING OF SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Starting Systems.
- B. Demonstration and instructions.
- C. Testing, adjusting and balancing.

1.2 RELATED SECTIONS

- A. Section 01 40 00 - Quality Requirements: Manufacturers field reports.
- B. Section 01 77 00 – Closeout Procedures: System operation and maintenance data and extra materials.
- C. Section 23 00 72 - Testing and Balancing: System Commissioning.

1.3 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Contracting Officer seven (7) working days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and/or Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01 33 00 that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to AAFES and Facility personnel two weeks prior to date of final inspection.

- B. Demonstrate project equipment by a qualified representative who is knowledgeable about the project.
- C. For equipment of systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with AFFES/Installation personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time at designated location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

1.5 TESTING, ADJUSTING AND BALANCING

- A. AAFES will appoint, employ, and pay for services of an independent firm to perform testing, adjusting, and balancing.
- B. The independent firm will perform services specified in Section 23 05 93.
- C. Reports will be submitted by the independent firm to the Contracting Officer indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.

1.6 DEPARTMENT OF DEFENSE DOCUMENTS

- A. **Contractor will be responsible for preparing and submitting the 1354 documents, Installed Property List and Building Info Checklist. Samples of these documents are included at the end of this Division for reference.**

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 65 00

SECTION 01 71 00**CLEANING****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Progress Cleaning.
- B. Final Cleaning.

1.2 RELATED SECTIONS

- A. General Provisions of the Contract.
- B. Section 01 10 00 - Summary.
- C. Section 01 14 50 - Cutting and Patching.
- D. Section 01 55 00 – Temporary Facilities, Barriers and Controls.
- E. Individual Specification Sections - Cleaning Requirements.

1.3 SAFETY REQUIREMENTS

- A. Standards: Maintain project in accordance with the following safety and insurance standards:
 - 1. The Corps of Engineers Manual, EM 385-1-1, latest edition, entitled: "General Safety Requirements", as referred to in General Provisions, Paragraph: Accident Prevention.
- B. O.S.H.A. Standards:
 - 1. The Contractor shall be required to comply with OSHA Requirements in 29 CFR 1926 and 29 CFR in 1910. The OSHA Standards are subject to change, and such changes may affect the Contractor in his performance under the contract. It is the Contractor's responsibility to know such changes, effective dates of changes, and comply with all requirements.
- C. Hazards Control:
 - 1. Store volatile wastes in covered metal containers and remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during the use of volatile or noxious substances.
- D. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on the installation.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. Execute cleaning to ensure that the building, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Maintain site in a clean and orderly condition.
- C. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- D. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off of Government property.
- E. Vacuum clean interior building areas when ready to receive finish painting, and continue cleaning to eliminate dust.
- F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Open free-fall chutes are not permitted.
- G. Schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.

3.2 FINAL CLEANING

- A. Employ professional cleaners for final cleaning.
- B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and of concealed spaces.
- C. Remove grease, dust, dirt, stains, temporary labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine; finish vacuum carpeted and soft surfaces.
- D. Repair, patch, and touch-up marred surfaces to specified finish, to match adjacent surfaces.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Broom clean paved surfaces; rake clean other surfaces of grounds.
- G. Clean all glass.
- H. Replace air conditioning filters if units were operated during construction.
- I. Clean ducts, blowers, and coils, if air H.V.A.C. units were operated without filters during construction.

- J. Maintain cleaning until project, or portion thereof, is occupied by AAFES.

END OF SECTION 01 71 00

SECTION 01 77 00**PROJECT CLOSEOUT****PART 1 - GENERAL**

1.1 SECTION INCLUDES:

- A. Substantial Completion.
- B. Final Inspections.
- C. Closeout Submittals.
 - 1. Operation and Maintenance Manuals.
 - 2. Operation and Maintenance Instruction.

1.2 RELATED SECTIONS:

- A. General Provisions of the Contract: Final Acceptance and Payment.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 71 00 - Cleaning.
- D. Section 01 65 00 – Starting of Systems.
- E. Section 01 78 39 - Project Record Documents.

1.3 SUBSTANTIAL COMPLETION:

- A. Preliminary Procedures: Before requesting inspection, complete the following.
 - 1. Contractor's list of incomplete items (punch list) prepared.
 - a. Submit PDF electronic file.
 - b. Submit paper copies.
 - 2. Owner advised of pending insurance changeover.
 - 3. Warranties, maintenance service agreements, and similar documents submitted.
 - 4. Releases, occupancy permits, and operating certificates submitted.
 - 5. Project Record Documents submitted.
 - 6. Tools, spare parts, and extra materials delivered.
 - 7. Final changeover of locks performed.
 - 8. Startup testing completed.
 - 9. Test/adjust/balance records submitted.
 - 10. Temporary facilities removed.
 - 11. Owner advised of heat and utility changeover.
 - 12. Changeover information for use, operation, and maintenance submitted.
 - 13. Owner's personnel instructed in operation, adjustment, and maintenance of equipment and system, including demonstration and training videotapes submitted.

- B. Contractor:
1. Submit written certification to Contracting Officer that project, or designated portion of Project, is substantially complete.
 2. Submit list of major items to be completed or corrected.
- C. Contracting Officer will make an inspection after receipt of certification.
- D. Should Contracting Officer consider that work is substantially complete:
1. Contractor shall prepare, and submit to Contracting Officer, a list of items to be completed or corrected, as determined by the inspection.
 2. Contracting Officer will prepare and issue a Certificate of Substantial Completion, containing:
 - a. Date of Substantial Completion.
 - b. Contractor's list of items to be completed or corrected, verified, and amended by Contracting Officer.
 - c. The time within which Contractor shall complete or correct work of listed items.
 - d. Time and date AAFES will assume possession of work or designated portion thereof.
 - e. Responsibilities of AAFES and Contractor for:
 - (1) Utilities.
 - (2) Operation of mechanical, electrical, and other systems.
 - (3) Maintenance and cleaning.
 - (4) Security.
 - f. Signatures of:
 - (1) Contracting Officer.
 - (2) Contractor.
 3. AAFES occupancy of project or designated portion of project:
 - a. Contractor shall:
 - (1) Perform final cleaning in accordance with Section 01 71 00.
 - b. AAFES will occupy project, under provisions stated in Certificate of Substantial Completion.
 4. Contractor: Complete work listed for completion or correction, within designated time.
- E. Should Contracting Officer consider that work is not substantially complete:
1. He shall immediately notify Contractor, in writing, stating reasons.
 2. Contractor: Complete work, and send second written notice to contracting officer, certifying that project, or designated portion of project, is substantially complete.
 3. Contracting Officer will reinspect work.

1.4 FINAL INSPECTION

- A. Contractor shall submit written certification that:
1. Contract documents have been reviewed.
 2. Project has been inspected for compliance with contract documents.

3. Work has been completed in accordance with Contract Documents.
 4. Equipment and systems have been tested in presence of Facility Representatives and are operational.
 5. Project is completed and ready for final inspection.
- B. Contracting Officer will make final inspection after receipt of certification.
- C. Should the Contracting Officer consider that work is finally complete in accordance with requirements of contract documents, he shall request contractor to make project closeout submittals.
- D. Should the Contracting Officer consider that work is not finally complete:
1. He shall notify contractor, in writing, stating reasons.
 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to the Contracting Officer certifying that work is complete.
 3. The Contracting Officer will reinspect work.
- 1.5 PROJECT RECORD DOCUMENTS:
- A. Project Record Documents: Specified requirements of Section 01 78 39.
- 1.6 OPERATION AND MAINTENANCE MANUALS:
- A. Submit data bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "Operation and Maintenance Manuals", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on 20 pound white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Value chart.
 - f. Maintenance instructions for equipment and systems.
 - g. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.

- b. Air and water balance reports.
- c. Certificates.
- d. Photocopies of warranties.
- e. Training Sessions attendance roster.
- f. Warrantees.

E. Submit six (6) copies of the operation and maintenance manuals to the Contracting Officer.

1.7 OPERATION AND MAINTENANCE INSTRUCTION:

- A. The Contractor shall provide, at his expense, manufacturer's representatives to completely check out all mechanical and electrical systems and items covered by the drawings and specifications. This requirement shall be scheduled just prior to, and during the initial start up. After all systems are functioning properly, the representatives shall instruct Facility Maintenance Personnel in the proper operation and maintenance of each item. In addition to instructions given at the project, the Facility Maintenance Personnel shall be given a classroom instruction course on operation and maintenance of the systems. Training sessions shall be limited to four (4) continuous hours where practical. Schedule additional four (4) hour sessions as required.

1.8 DD FORM 1354:

- A. Preparation of DD Form 1354 "Transfer and Acceptance of Military Real Property": At the conclusion of the project the Contractor will compile and furnish to the Contracting Officer certain costs and quantity data of materials and systems furnished and installed. A list of items for which the costs and quantity data are required will be furnished to the Contractor. Such information will be returned to the Contracting Officer within 10 days from the receipt of the list. Form is attached at the end of Division 1.

1.9 WARRANTY AND EXTENDED WARRANTIES:

- A. Upon completion of project, prior to final payment, guarantees required by technical divisions of Specifications shall be properly executed in quadruplicate by subcontractors and submitted to Contracting Officer. Delivery of guarantees shall not relieve contractor from any obligation assumed under contract.
- B. Submit guarantee covering entire project for one year. In addition, where separate guarantees, for certain portions of work, are for longer periods, General Contractor's guarantee shall be extended to cover such longer periods.
- C. Guarantees shall become valid and operative upon issuance of Certificate of Inspection and Acceptance by AAFES. Guarantees shall not apply to work where damage is a result of abuse, neglect by AAFES, or his successor(s) in interest.

END OF SECTION 01 77 00

SECTION 01 78 39**PROJECT RECORD DOCUMENTS****PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Submittals: Section 01 33 00 – Submittal Procedures.

1.2 RECORD FIELD DATA

- A. General: Maintain at job site, two complete sets of Contract Documents. During construction, both sets shall be marked to show all deviations in actual construction from the Contract Documents.

1. Red Markers: Indicate all additions.
2. Green Markers: Indicate all deletions.

- B. Record Documents: The drawings shall show, but no be limited to, the following information:

1. Locations and description of any utility lines and other installations of any kind or description known to exist within the construction area. Include dimensions and/or survey coordinates to permanent features.
2. Locations and dimensions of any changes within the building or structure and the accurate location and dimension of all underground utilities and facilities.
3. Correct grade or alignment of roads, structures and utilities if any changes were made from Contract Drawings.
4. Correct elevations if changes were made in site grading.
5. Changes in details of design or additional information obtained from shop drawings prepared or furnished by the Contractor including, but not limited to:
 - a. Fabrication erection
 - b. Installation and placing details
 - c. Pipe sizes
 - d. Insulation materials
 - e. Equipment pad dimensions
6. Topography and grades of all drainage.
7. All changes or modifications from the original design.
8. Where contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the Record Drawings. The option not used shall be deleted.

- C. Record Field Data: All deviations shall be shown in the same general detail utilized in the Contract Documents. Marking of the documents shall continue throughout construction to keep the documents up to date.

1. Additional Data: The Contractor shall maintain the following:
 - a. Full size marked-up drawings.
 - b. Survey notes
 - c. Sketches
 - d. Nameplate data

- e. Pricing information
 - f. Description and serial number of all equipment
2. Record field data shall be available for inspection by the Contracting Officer whenever requested and shall be jointly inspected for accuracy and completeness by the Contracting Officer and Contractor. Failure to keep record field data current shall be sufficient justification to withhold a retained percentage from the monthly Application for Payment.
- D. Submittal of Record Field Data:
1. Submit two sets to the Contracting Officer a minimum of 20 calendar days prior to the date of final inspection.
 2. The Contractor shall make all corrections identified during Contractor Officer review and resubmit corrected data within ten (10) calendar days of receipt.
 3. When data is accepted as complete, one set of documents will be returned to the Contractor for completion of the Record Documents.

1.3 RECORD ELECTRONIC FILE DOCUMENTS

- A. Electronic File Format: No earlier than 30 days after award, the Contracting Officer will provide one set of AutoCAD electronic file format contract drawings to be used for preparation of Record Drawings.
1. Media: ISO – 9660 CD
 2. The Contractor shall verify usability of AutoCAD files and notify the Contracting Officer of any discrepancies within 30 calendar days of receipt. Any discrepancies will be corrected and files returned to the Contractor.
 3. The Contractor shall incorporate all deviations from the original Contract Documents as recorded in the approved "Record Field Data" as indicated in Paragraph 1.2.C above.
 4. The Contractor shall also incorporate all written modifications to the Contract Documents which were issued by amendment or contract modification.
 5. All revisions and changes shall be incorporated:
 - a. Items marked deleted shall be deleted.
 - b. Clouds around new items shall be removed.
- B. Electronic File Submittal: Submit a complete set of Record Drawings in AutoCAD electronic file format no later than 30 days after final acceptance. The Record Drawings shall be done in equal quality to the originals, including line work, line weights, lettering and symbols. Identify each drawing with the word "RECORD" in block letters at least 3/8" high above the title block. The date of completion and the words "Revised Record" shall be placed in the revision block above the latest revision notation.
1. Format: AutoCAD Release 2005 'DWG' format. All support files required to display or plot the files in the same manner as they were developed shall be delivered along with the files, including but not limited to:
 - a. Font files
 - b. Menu files
 - c. Plotter setup
 - d. Referenced files

2. Layering: Conform to AIA Standard Document, "CAD Layer Guidelines," latest version. An explanatory list of which layer is used at which drawing and an explanatory list of all layers which do not conform to the standard AIA CAD Layer Guidelines including any user definable fields permitted by the guidelines shall be provided with each submittal. CAD standards to meet SAFB CAD standards for electronic drawing documents and as-builts. See attached 82 CES/DS2 CAD Standard.
3. Electronic File Deliverable Media: ISO 9660 Format CD-ROM. Submit three (3) complete sets of disks and one complete set of full size reproducible prints taken from the disks. Each disk shall have a clearly marked label stating the Contractor's firm name, project name and location, submittal type (record) and date. Each submittal shall be accompanied by a hard copy transmittal sheet that contains the above information along with tabulated information about each file as shown below:

<u>Electronic File Name</u>	<u>Plate Number</u>	<u>Drawing Title</u>
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- a. Include electronic version of the table.

4. Submit one copy of the CD-Rom and one set of full-size Mylar reproducibles of the drawings to DS2 Base Civil Engineering office located in Building 1402.

1.4 SUBMITTAL OF FINAL RECORD DRAWINGS

- A. Complete and return the final record documents and the approved preliminary record documents to the Contracting Officer within 30 calendar days of final acceptance.
 1. All drawings from the original contract documents shall be included, including drawings where no changes were made.
 2. The drawings will be returned to the Contractor if corrections are necessary.
 3. The Contractor shall make all corrections and shall return the drawings to the Contracting Officer within seven (7) calendar days of receipt.

1.5 RECORD DOCUMENT COST

- A. All costs incurred by the Contractor in the proportion and furnishing of record documents, including electronic file format, shall be included in the contract price and no separate payment will be made for this work.
 1. Approval and acceptance of the final record documents shall be accomplished before final payment is made to the Contractor.

1.6 SYSTEM ACCEPTANCE TESTING

- A. Provide one set of marked-up record drawings at the time of system acceptance testing. These record drawings shall be in addition to the submittal of marked-up record drawings specified elsewhere in the contract.

END OF SECTION 01 78 39

SECTION 02 41 19**SELECTIVE STRUCTURE DEMOLITION**

1.1 SUMMARY

- A. Demolition and removal of selected portions of building or structure.
- B. Demolition and removal of selected site elements.
- C. Salvage of existing items to be reused or recycled.

1.2 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area.
- B. Hazardous Materials: **Asbestos testing is pending and report will be provided before construction starts.** Provide ACM report, remediation and all landfill records to Lester Givens DS2 Construction Supervisor.
 - 1. Remediation: By Contractor as part of this Project.
 - 2. Landfill records for hazardous wastes.
- C. Historic removal or dismantling required.

1.3 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 ANSI/ASSE A10.6 and NFPA 241.

1.4 WARRANTY

- A. Existing Warranties: Roof. Roof work to no void existing Warranties.

1.5 EXECUTION

- A. Professional engineer engaged to survey condition of building.
 - 1. Recorded by use of measured drawings and preconstruction photographs.
- B. Utility Services and Mechanical/Electrical Systems: Maintained to occupied facilities.
 - 1. Shut Off: By Owner.

- C. Site Access and Temporary Controls: Minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities
 - D. Temporary Facilities:
 - 1. Temporary barricades to prevent injury to people.
 - 2. Temporary weather protection.
 - 3. Protection of existing finish work to remain.
 - 4. Protection of furnishings and equipment.
 - E. Temporary shoring.
 - F. Reuse of Building Elements:
 - 1. Building Structure and Shell: Maintain 95 percent.
 - 2. Nonshell Elements: Maintain 60 percent.
 - G. Removed and Salvaged Items: Cleaned, crated, stored, and transported to Owner's on-site storage area.
 - H. Removed and Reinstalled Items: Cleaned, repaired, crated, stored, and reinstalled.
 - I. Existing Items to Remain: Existing construction protected against damage.
 - J. Disposal of Demolished Items:
 - 1. Burning: Not permitted.
 - 2. Disposal: At designated spoil areas Off Owner's property.
- 1.6 SELECTIVE DEMOLITION SCHEDULE
- A. Refer to drawings for extent of demolition.

END OF SECTION 02 41 19

SECTION 03 35 40**INTERIOR CONCRETE SLAB REPAIRS AND JOINT FILLER REPLACEMENT****PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Joint filler removal and replacement, with or without metal keyway.
 - a. Contractor is to provide unit price per linear foot in Section 01 22 00 for joint filler removal and replacement based on the following formula:
 - 1) Total Area to be Polished X 0.14 = Total Projected Linear Feet of Joint Filler Removal and Replacement to be Included and Broken Out in the Bid.
2. Spalled joint repair or joint with metal keyway (less than 3/4")
 - a. Contractor is to provide unit price per linear foot in Section 01 22 00 for keyway segment removal and filler installation based on the following formula:
 - 1) Total Area to be Polished X 0.08 = Total Projected Linear Feet of keyway segment removal to be Included and Broken Out in the Bid.
3. Spalled joint repair, joint with metal keyway or self-leveling compound removal (great than 3/4")
 - a. Contractor is to provide unit price per linear foot in Section 01 22 00 for keyway segment removal and repair material installation based on the following formula:
 - 1) Total Area to be Polished X 0.08 = Total Projected Square Feet of keyway segment and self-leveling compound removal and repair material installation to be Included and Broken Out in the Bid.
4. Crack repair.
 - a. Contractor is to provide unit price per linear foot in Section 01 22 00 for crack cleaning and filling based on the following formula:
 - 1) Total Polished Area X 0.03 = Total Projected Linear Feet of Crack Repair to be Included and Broken Out in the Bid.
5. Surface defect repair, including pop-outs, spalls, and gouges.
 - a. Contractor is to provide unit price per occurrence in Section 01 22 00 for pop-out and spall repair based on the following formula.
 - 1) Total Polished Area X 0.025 = Total Projected Occurrences of 3/4" to 1-1/2" DIA X 1/2" Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.
 - 2) Total Polished Area X 0.025 = Total Projected Occurrences of 1-1/2" to 3" DIA X 1/2" Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.
6. Surface embed repair, including cleanouts, in-floor electrical outlets and Walker Duct access holes.
 - a. Contractor is to provide unit price per occurrence in Section 01 22 00 for over-coring cleanouts, in-floor electrical outlets and Walker Duct access holes based on the following formula.
 - 1) Total Polished Area X 0.001 = Total Projected Occurrences of 4" average DIA X 1/2" Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.
7. Large area surface repair, existing underlayment removal and replacement
 - a. Contractor is to provide unit price per square foot in Section 01 22 00 for large area surface repair of rough surface, or removal and replacement of existing underlayment's > 1/4" in thickness.
 - 1) 1/4" Minimum Thick Self-leveling Topping to be Included as a Unit Cost
8. Grout coat surface enhancement, including micro-pin holes, pitting and other shallow surface deficiencies.

- a. Contractor is to provide unit price per square foot in Section 01 22 00 for grout coat surface enhancement based on the following formula:
 - 1) $\text{Total Polished Area} \times 0.10 = \text{Total Projected Square Feet of Grout Coat to Include and Breakout in Bid.}$
- 9. Full Grind, Densify, Dye and Polish portions of the project not currently indicated on the drawings.
 - a. Contractor is to provide unit price per square foot in Section 01 22 00 to provide a Full Grind, Densify, Dye and Polish for portions of the project not currently indicated on the drawings.
 - 1) Full Grind, Densify, Dye and Polish to be Included as a Unit Cost

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Procedures for Submittals.
- B. Joint Filler Installer Qualification Certification:
 - 1. Company branch or regional office shall provide a list of five projects minimum performed within the last three years of similar type, size and complexity as this contract. Provide project names, addresses, contact names and phone numbers for each project. General Contractor to validate the abilities of the subcontractor prior to submitting bid.
 - 2. Submit letter of certification, identifying specific individuals that are currently certified installers of the specified materials and are familiar with proper procedures and installation methods as required by the specified product manufacturers.
- C. Product data for:
 - 1. All products and primary equipment used for repair of existing concrete slab defects.

1.3 QUALITY ASSURANCE

- A. AAFES reserves the right to engage the services of a Concrete Consultant to review, observe and inspect the work in progress.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Limit and control damage from excessive dust caused by demolition, preparation, and installation of all Work.
- B. Limit and control damage from moisture.
- C. All replaced concrete shall be cured a minimum of 8 calendar days prior to joint filler installation.
- D. Concrete repair area shall be closed to traffic during preparation and repair for a time as recommended by manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Subject to compliance with project requirements, provide products as manufactured by the following to the extent as specified hereinafter:
 - 1. Metzger/McGuire
 - 2. Roadware
 - 3. Hi-Tech Systems
 - 4. VersaFlex Incorporated
 - 5. CTS Cement Manufacturing Corporation

6. Ardex Engineered Cements
7. Husqvarna Construction Products

- B. Polyurea Joint Filler: Rapid setting, two-component polyurea polymer liquid of 100% solids content, Shore hardness 85-90, compatible with construction materials in contact.
1. RS 88 Polyurea in complementary darker color to match Dyed Polished Concrete, by Metzger/McGuire.
 2. HT-PE85 Polyurea in complementary darker color to match Dyed Polished Concrete, by Hi-Tech Systems
 3. SL/85 Polyurea in complementary darker color to match Dyed Polished Concrete, by VersaFlex Incorporated
 4. Colors to be reviewed and approved by AAFES Project Manager in mock-up.
- C. Joint Filler Stain Preventing Film:
1. SPF by Metzger/McGuire.
- D. Low Viscosity Crack and Spall Repair:
1. Rapid ReFloor in complementary matching color, by Metzger/McGuire.
 2. HT Spall-FX2 in complementary matching color, by Hi-Tech Systems
 3. Quick-Mender in complementary matching color, by VersaFlex Incorporated
 4. 10 Minute Mender or Matchcrete by Roadware
 5. Colors to be reviewed and approved by AAFES Project Manager in mock-up.
- E. Wide Area Surface Repairs
1. TRU Self Leveling, by CTS Cement Manufacturing Corporation
 2. Diama-Top by Ardex Engineered Cements
 3. Color after application of Specified Dye to be reviewed and approved by AAFES Project Manager in mock-up.
- F. Pin Hole and Surface Pitting Grout Coat
1. GM 3000, by Husqvarna Construction Products
 2. StarSeal Fusion, by Vexcon Chemicals, Inc
 3. Diama-Fill, by Ardex Engineered Cements
 4. Color after application of Specified Dye to be reviewed and approved by AAFES Project Manager in mock-up.
- G. Silica Sand
1. Dry 00 Sandblasting sand.

2.2 EQUIPMENT

- A. Subject to compliance with project requirements, provide equipment manufactured by the following:
1. HTC
 2. Concrete Polishing Technologies
 3. Joe Due Blades and Equipment
 4. Pulman-Ermator
 5. SASE Company, Inc.
 6. U.S. Saws
 7. Diamatic
 8. VIC International Corporation
 9. Engrave-a-Crete
- B. Dust extraction system for grinding/sawing:
1. HEPA filtration vacuum, designed for use with all hand tools when grinding or sawing concrete (minimum 125CFM air flow).

2. Provide one of the following:
 - a. 26D, by HTC.
 - b. S2400, by Pullman-Ermator.
 - c. Bull 50, by SASE Company, Inc.
 - d. Approved equal.

- C. Joint Filler Removal and Preparation
 1. Humpback Cutter Complete, by Joe Due.
 2. Dust Buggy, by U.S. Saws.
 3. The Mongoose, by Engrave-a-Crete
 4. Approved equal.

- D. Crack Repair:
 1. 5" Dustmizer 007, by Joe Due.
 2. 5" Crack Attacker, by Joe Due.
 3. 7" Handheld Crack Chaser, by Joe Due.
 4. SawTec 5" Tile Vac, by U.S. Saws.
 5. SawTec 7" Crac-Vac, by U.S.Saws.
 6. Approved equal.

- E. Surface Grinder: Handheld 5"-7" electric surface grinder with dustless shroud/housing.
 1. Dust Avenger 5, by Joe Due.
 2. Dust Avenger 7, by Joe Due.
 3. SawTec 5" Grinder Vac, by U.S. Saws.
 4. SawTec 7" Grinder Vac, by U.S. Saws.
 5. Approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. An evaluation of the existing floor slab shall be conducted, identifying all defects. Scope of repairs shall be confirmed by the AAFES Project Manager, Architect of Record, or AAFES Concrete Consultant prior to commencement of work. Identify scope of work on Floor Polishing Plan specified in other section(s) of Division 3 – Concrete.

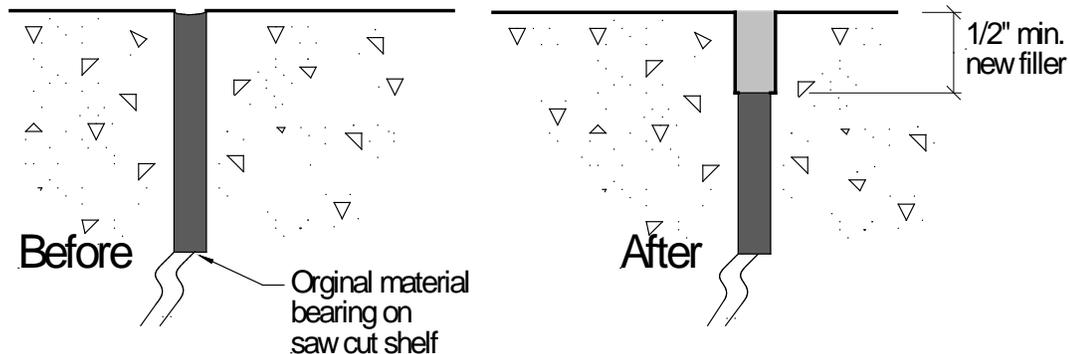
- B. Repairs are not to be conducted until Unit Price in attached Worksheet has been reviewed and approved by the AAFES Contracting Officer.

- C. Repairs exceeding the Estimated Scope of Repairs developed in the attached Worksheet and included in the Base Bid must be approved by the AAFES Contracting Officer prior to executing the work in any new Phase.

3.2 PREPARATION

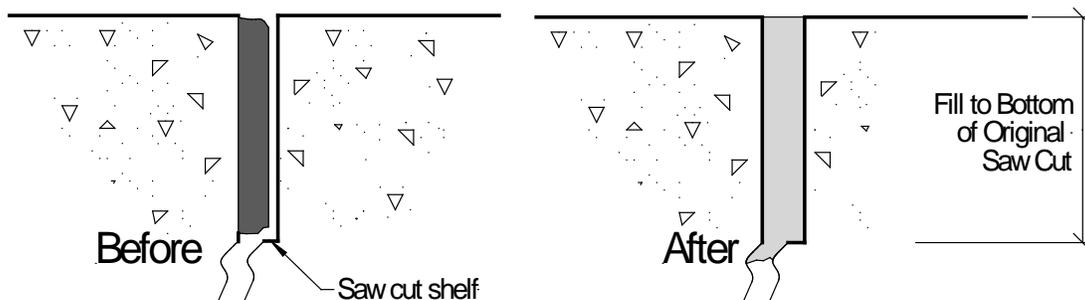
- A. Protect surface of slab immediately adjacent to defect under repair.

3.3 JOINT MILLING AND CAP FILLER REPLACEMENT



- A. If existing joint filler is sound and resting on top of saw cut shelf, mill top 1/2" of material and refill with specified Polyurea joint filler.
1. Re-saw the joint to a minimum depth of 1/2" with a dry-cut, vacuum-equipped saw using a slightly oversized blade. The blade width should be sufficient to encapsulate the widest spall along a given contraction joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through the joint.
 2. Refill with polyurea joint filler material from the bottom up, taking care not to entrap large air bubbles per manufacturer's recommendation. Slightly overfill and shave flush to the surface, prior to grinding process.
 3. Ensure that after grinding, the joint is cut smooth and flush with the finish floor surface, without concave or intermittent, darkened profile.

3.4 FULL DEPTH JOINT FILLER REPLACEMENT

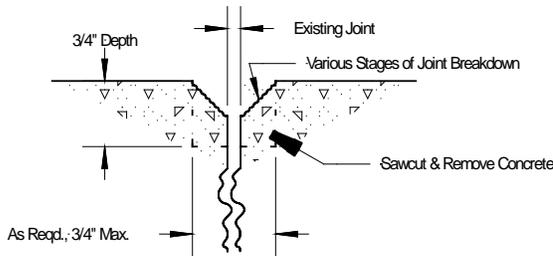


Note: if shelf width at base of saw cut is less than 1/4" on either side of joint, minimum required filler depth is 2" placed over compressible backer rod or bagged silica sand.

- A. If existing joint filler is loose, easily removed, or able to be forced downward with a hand tool, remove all filler material from joint and refill.
1. Re-saw joint full depth with a dry-cut, vacuum-equipped saw using a slightly oversized blade. The blade width should be sufficient to encapsulate the widest spall along a given contraction joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through the joint. Remove all filler material, debris, and laitance.
 2. Refill with polyurea joint filler material from the bottom up, taking care not to entrap large air bubbles per manufacturer's recommendation. Slightly overfill and shave flush to the surface prior to grinding process.

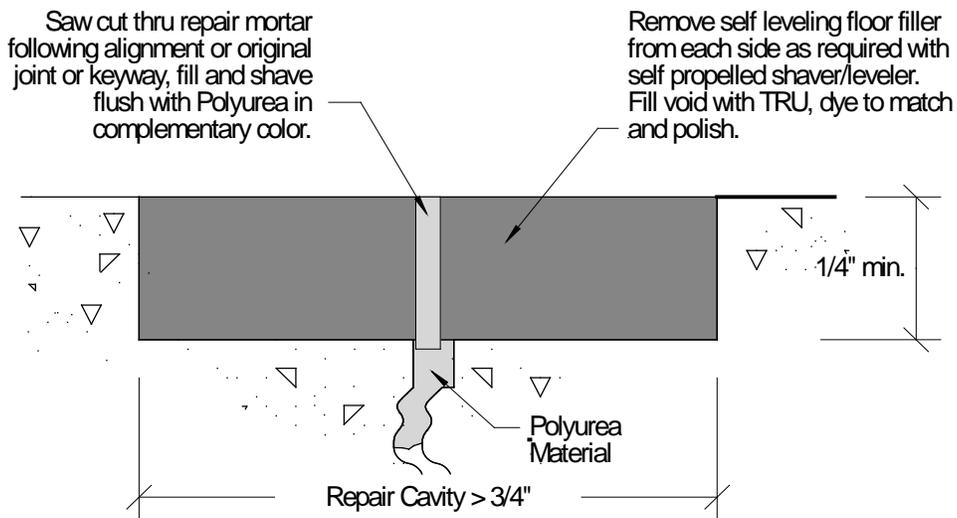
3. Ensure that after grinding, the joint is cut smooth and flush with the finish floor surface, without concave or intermittent, darkened profile.

3.5 NARROW SPALLED JOINT REPAIR OR JOINT WITH METAL KEYWAY (LESS THAN 3/4")



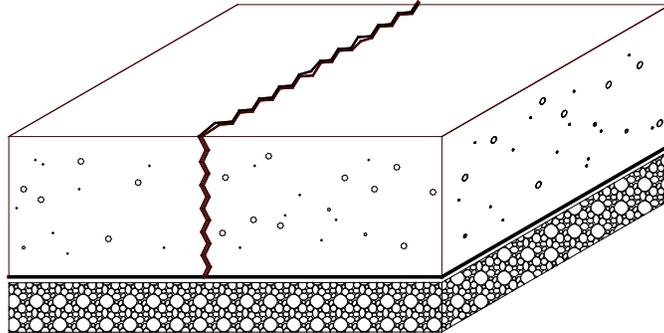
- A. For joints that are spalled, are constructed with metal keys or have radius tooled edges not exceeding 3/4" in width at slab surface.
 1. Re-saw the joint edge to a minimum depth of 3/4" with a dry-cut, vacuum-equipped saw allowing removal of the widest spall (or top of radius) along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint.
 2. Clean joint of loose concrete, metal key fragments, joint filler, laitance, dirt, debris, backer rod, etc.
 3. Joints must be free of all visible moisture.
 4. Ensure filler penetrates the irregular aggregate interlock portion of the sawn contraction joint as shown below, re-establishing the aggregate interlock that may have been lost due to shrinkage, curling, and lack of reinforcement.
 5. Fill joint cavity with specified Polyurea joint filler per manufacturer's instructions, taking care not to entrap large air bubbles. Overfill joint slightly and shave flush to slab surface prior to grinding process.

3.6 WIDE SPALLED JOINT REPAIR (GREATER THAN 3/4")



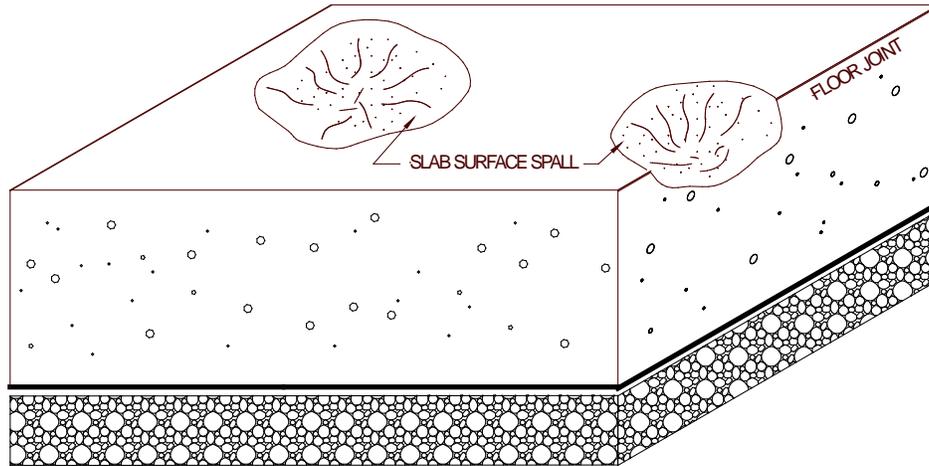
- A. For joints that are spalled, contain metal key or self leveling floor material that exceeds 3/4" in width at slab surface.
1. Re-saw the joint edge to a minimum depth of 1/4" with a dry-cut, vacuum-equipped shaver/leveler allowing removal of the widest spall or non-linear keyway along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint. Maintain consistent width of repair to within 1/2 inch in 10 feet.
 2. Overfill repair cavity with overlay material per manufacturer's instructions, dye and grind flush to slab surface.
 3. After repair has cured, and prior to any traffic on patched surface, re-saw original slab joint(s) 3/4" in depth to honor joint and fill full depth with Polyurea joint filler per manufacturer's instructions.

3.7 CRACK REPAIR



- A. Crack width less than 1/32" without surface spalling.
1. Do not repair.
 2. Grout coat may be used to fill thin hairline deficiencies.
- B. Cracks from 1/32" to 1/4" in width.
1. Clean crack cavity.
 2. Remove loose concrete, dirt and debris from crack with a wire brush or hand grinder with twisted wire wheel attachment, 1/2" minimum depth, insuring crack sidewall is clean.
 3. Remove any loose segments, including islands formed by crack, with sharp tool.
 4. Use methods that will not widen existing crack.
 5. Vacuum crack to remove all dirt, debris and other laitance.
 6. Mask slab surface along crack as necessary to minimize overfill.
 7. Choose material color that closely matches the adjacent floor.
 8. Install low viscosity crack and spall repair material in accordance with manufacturer's instructions.
 9. Repeat until all voids are filled and material crowns slab surface.
 - a. Do not flood area around crack.
 - b. Watch for bubble formation and out gassing.
 - c. Do not allow material to gel before adding additional material.
 10. Shave or grind material flush to surface as stipulated by manufacturer.

3.8 SURFACE SPALLING REPAIR



- A. For slab surface that is chipped and spalled, where the deficiency is 1/2" in length or width up to 3" in length or width, by 1/2" in depth.
1. Route edge of spall to provide 1/8" deep square edge or 30° edge (consult manufacturer's data sheet for specific surface preparation instructions).
 2. Use small hand grinder with maximum 5" diameter dry diamond blade and vacuum system attachment.
 3. Do not overcut slots into existing slab surface.
 4. Clean and prep spalled cavity.
 5. Wire brush spalled surface to remove all dirt and laitance.
 6. Mask slab at perimeter of spall with tape.
 7. Install Low Viscosity Crack and Spall Repair material.
 8. Polish over repair area with diamond disks to blend surface.
 9. Feather filler material into the adjacent concrete floor surface.
 10. With 2000 grit disk and firm pressure, add a few burn marks to mottle surface to blend with adjacent floor surface.
 - a. NOTE: For inconsistent, varying spalled joints that comply with the measurements in this section, a form material may be needed to temporarily form and support the vertical face of spalled joint edge. Ensure that the repair material will not adhere to the form and the rigid repair material does not fuse the joint together.
 11. For cleanouts, in-floor electric outlets and Walker Duct access plates, over-core around perimeter of existing embed by 1/2" in width and depth, then install Low Viscosity Crack and Spall Repair Material.

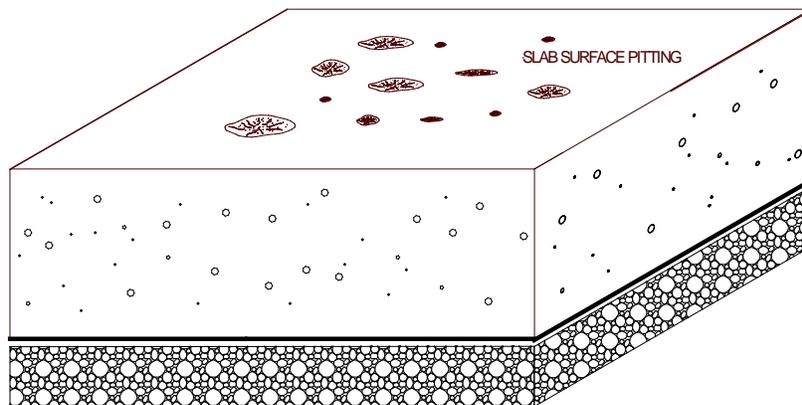
3.9 BOLT HOLE, CONDUIT REPAIR

- A. For slab surfaces containing surface or sub-surface bolts, bolt-hole voids, conduit or subsurface conduit.
1. Recess steel bolt or conduit a minimum of 1/2" below finish floor by either punching or cutting.
 - a. Check with General Contractor prior to cutting into active electrical or communication conduit.
 2. For spall fractured edges less than 30 degrees, square edge to a minimum 1/8" depth with either a drill bit, chisel or edge grinder.
 3. Clean cavity of all debris and laitance with drill activated, brass wire wheel. Vacuum hole to remove all dirt, debris and other laitance.
 4. Dispense Low Viscosity Crack and Spall Repair at moderate pace using steady pressure. Dispense material into void, refilling as necessary to produce slight crown.
 5. Grind material flush to slab surface per manufacturer's instructions.

3.10 LARGE SURFACE REPAIR, UNDERLAYMENT REMOVAL AND REPLACEMENT

- A. For slab surfaces containing wide-area irregular rough surfaces greater than 3" in width and length such as irregular coarse aggregate surfaces or surfaces with existing tile or carpet underlayment's > 1/4" in thickness.
1. Define edge perimeter with diamond masonry wheel or shaver/leveler to produce sharp edge, at least 1/8" deep.
 2. Roughen base surface using shaver/leveler to ICRI CSP 3 – 5 and vacuum clean.
 3. Wire brush to remove any small loose material and vacuum again.
 4. Mix and install overlay material in accordance with manufacturer's instructions.
 5. Place repair material in floor surface defect, float level or leave slightly proud of existing floor.
 6. Grind, densify, dye and polish to match adjacent concrete.
 7. Re-establish original concrete slab joints by sawing completely through patch and re-filling with Polyurea joint filler prior to exposure to traffic.

3.11 SMALL SURFACE PITTING, PINHOLE REPAIR, GROUT COAT



- A. For surfaces consisting of micro-deficiencies, pin holes, hairline cracks and other surface clutter that impedes the achievement of the specified overall gloss values
1. Clean pitted sections with 90-degree angle grinder equipped with wire wheel to remove all dirt/laitance. Wheel should be run over defect in multiple directions to ensure proper cleaning.
 2. Vacuum prepared pitted sections.
 3. Install and disperse grout coat using GM 3000, StarSeal Fusion, or Diama-Fill in accordance with manufacturer's directions.
 4. Ensure a thin, uniform layer of repair material covers the pitted areas. Refill any low spots as needed.
 5. Grind or polish flush with metal or resin-bond diamonds, ensuring repair material is flush with slab surface.
 6. Repeat repairs in areas as required if repair material pulls out of defects.
 7. Apply required applications of specified dye and polish smooth to meet specified overall gloss values.

3.12 PROTECTION

- A. Protect surfaces of finished floor.
- B. Prohibit traffic until floor repairs have received final approval by Owner.

WORKSHEET

INTERIOR CONCRETE SLAB ENHANCEMENT, REPAIR AND JOINT FILLER REPLACEMENT

(To Be Turned in with Sub-Contractor's Bid Behind Form 4450-024, Page 2)

ENTER TOTAL AREA TO BE POLISHED: _____ SQUARE FEET					
ITEM	AREA FROM ABOVE	MULTIPLIER	TOTAL FROM MULTIPLIER	UNIT RATE INCLUDED IN BID	TOTAL COST INCLUDED IN BID
..... SAMPLE CALCULATION NOT PART OF BID					
Joint Filler Removal and Replacement	36,000	0.14	5014 LF	\$2.75 / LF	\$13,788.50
..... DO NOT INCLUDE SAMPLE CALCULATION COST IN BID					
1. Joint Filler Removal and Replacement	_____	0.14	_____ LF	\$_____ / LF	\$_____
2. Spalled joint repair or joint with metal keyway (less than 3/4")	_____	0.08	_____ LF	\$_____ / LF	\$_____
3. Spalled joint repair, joint with metal keyway or self-leveling compound removal (great than 3/4")				\$_____ / LF	
4. Crack repair	_____	0.03	_____ LF	\$_____ / LF	\$_____
5a. Surface defect repair, including pop-outs, spalls, and gouges 3/4 – 1-1/2" DIA	_____	0.025	_____ UNITS	\$_____ / EA	\$_____
5b. Surface defect repair, including pop-outs, spalls, and gouges 1.1/2 - 3" DIA	_____	0.025	_____ UNITS	\$_____ / EA	\$_____
6. Surface embed repair, including cleanouts, in-floor electrical outlets and Walker Duct access holes.	_____	0.001	_____ UNITS	\$_____ / EA	\$_____
7. Large surface repair, existing underlayment removal and replacement wit 1/4" Polished Overlay.				\$_____ / SF	
8. Grout coat surface enhancement, including micro-pin holes, pitting and other shallow surface deficiencies	_____	0.10	_____ SF	\$_____ / SF	\$_____
9. Full Grind, Densify, Dye and Polish portions of the project not currently indicated on the drawings.				\$_____ / SF	

END OF SECTION 03 35 40

SECTION 05 40 00**COLD-FORMED METAL FRAMING****PART 1 – GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Load bearing formed steel stud exterior and interior framing 20 gage and heavier.
2. Cold formed steel cee-joists.
3. Cold formed steel ceiling joists.
4. Cold formed steel stud header wall framing and bracing supported from roof structure.
5. Cold formed deep leg track (capture track) for interior nonload-bearing steel stud partitions.
6. Cold formed steel stud partition between stockroom and sales area.

B. Related Sections:

1. Section 05 12 00 - Structural Steel: Connecting to structural building framing.
2. Section 06 10 00 - Rough Carpentry: Wood furring strips, plywood, and blocking.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 153 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM C 954 - Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in (2.84 mm) in Thickness.
4. ASTM C 955 - Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Track), and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Bases.

B. American Welding Society (AWS):

1. AWS D1.3 - Structural Welding Code - Steel Sheet.

C. Gypsum Association (GA):

1. GA-201 - Gypsum Board for Walls and Ceilings.
2. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.

D. Steel Structures Painting Council (SSPC):

1. SSPC-Paint 20 Type I - Zinc Rich Primers - Inorganic.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in the installation of cold formed metal framing components with minimum five years documented experience.

B. Install system to provide for movement of components without damage, failure of joint seals,

undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

- C. Install system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- D. Qualifications for Welding Work: Qualify welding operators in accordance with AWS Standard Qualification Procedures. Provide certification that welders employed in work have satisfactorily passed AWS qualification tests within previous 12 months. If recertification of welders is required, provide without additional cost to Owner.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Transport, handle, store, and protect products.
- B. Protect metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- C. Store and protect with waterproof covering; ventilate to avoid condensation.
- D. Where framing is stored outdoors, stack materials off ground, supported on level platform, fully protected from weather.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Unimast Incorporated, Franklin Park, IL (800) 969-4110.
 - 1. Unimast framing component designations are used within this Section to identify framing types.
 - 2. Alternate Manufacturers: Subject to compliance with project requirements metal framing materials by alternate manufacturers equivalent to those specified are acceptable.

2.2 MATERIALS

- A. Interior and Exterior Load-Bearing Studs: ASTM A 653 and ASTM C 955; galvanized sheet steel, channel shaped, punched for utility access, depth and gage as indicated on Drawings.
 - 1. 400S162-33 - 4 inch studs, 1 5/8" flange, 1/2" return lip, 0.0329" minimum thickness.
 - 2. 400S162-43 - 4 inch studs, 1 5/8" flange, 1/2" return lip, 0.0428" minimum thickness.
 - 3. 400S162-54 - 4 inch studs, 1 5/8" flange, 1/2" return lip, 0.0538" minimum thickness.
 - 4. 600S162-33 - 6 inch studs, 1 5/8" flange, 1/2" return lip, 0.0329" minimum thickness.
 - 5. 600S162-43 - 6 inch studs, 1 5/8" flange, 1/2" return lip, 0.0428" minimum thickness.
 - 6. 600S162-54 - 6 inch studs, 1 5/8" flange, 1/2" return lip, 0.0538" minimum thickness.
 - 7. 800S162-33 - 8 inch studs, 1 5/8" flange, 1/2" return lip, 0.0329" minimum thickness.
 - 8. 800S162-43 - 8 inch studs, 1 5/8" flange, 1/2" return lip, 0.0428" minimum thickness.
 - 9. 800S162-54 - 8 inch studs, 1 5/8" flange, 1/2" return lip, 0.0538" minimum thickness.
- B. Interior and Exterior Load-Bearing Cee-Joists: ASTM A 653 Structural Quality; galvanized sheet steel, channel shaped, depth and gage as indicated on Drawings.
 - 1. 400U162-33 - 4 inch studs, 1 5/8" flange, 0.0329" minimum thickness.
 - 2. 400U162-43 - 4 inch studs, 1 5/8" flange, 0.0428" minimum thickness.
 - 3. 400U162-54 - 4 inch studs, 1 5/8" flange, 0.0538" minimum thickness.

4. 600U162-33 - 6 inch studs, 1 5/8" flange, 0.0329" minimum thickness.
 5. 600U162-43 - 6 inch studs, 1 5/8" flange, 0.0428" minimum thickness.
 6. 600U162-54 - 6 inch studs, 1 5/8" flange, 0.0538" minimum thickness.
 7. 800U162-33 - 8 inch studs, 1 5/8" flange, 0.0329" minimum thickness.
 8. 800U162-43 - 8 inch studs, 1 5/8" flange, 0.0428" minimum thickness.
 9. 800U162-54 - 8 inch studs, 1 5/8" flange, 0.0538" minimum thickness.
- C. Partition Floor Tracks and Runners: ASTM A 653 and ASTM C 955; galvanized sheet steel, channel shaped; same depth and gage as studs; tight fit; solid web.
1. zzzT125-33: .0329" minimum thickness, 1 1/4" flange x stud size (zzz)
 2. zzzT125-43: .0428" minimum thickness, 1 1/4" flange x stud size (zzz)
 3. zzzT125-53: .0538" minimum thickness, 1 1/4" flange x stud size (zzz)
- D. Capture Track:
1. zzzT300-43: Standard steel track, ASTM C 955; galvanized sheet steel, channel shaped; .0428" min thickness, 3" flange x stud depth (zzz).
Contractor's Option: Contractor may provide VertiClip by The Steel Network, Raleigh, NC (888) 474-4876. VertiClip may be used for fastening studs to track. If this option is used, track may be .0329" minimum thickness for all stud sizes.
 2. zzzT300-54: Fabricated bent plate, ASTM A 653, galvanized steel sheet, size, configuration, thickness and fasteners as indicated on Drawings.
- E. Load-Bearing Wall Furring and Partition Bracing: ASTM A 653 and ASTM C 955, galvanized sheet steel.
1. Studs:
 - 362S162-33 - 3-5/8 inch studs, 0.0329" minimum thickness.
 - 362S162-43 - 3-5/8 inch studs, 0.0428" minimum thickness.
 - 362S162-54 - 3-5/8 inch studs, 0.0538" minimum thickness.
 2. Cold-Rolled Channels: 3/4 inch x 1/2 inch and 1-1/2 inch x 17/32 inch.
 3. Clip Angles: 2 inches x 2 inches x 16 gage x 1/4 inch less than stud width or Bridge Clip by The Steel Network (888) 474-4876.
- F. Framing Attachment Angles: ASTM A 653 Structural Quality; galvanized sheet steel, size, shape and configuration as indicated on Drawings, 14 gage, unless indicated otherwise on Drawings.
- G. Ceiling Joists and Runners: ASTM A 653 and ASTM C 955; galvanized sheet steel, cee shaped.
1. 800S162-33 - 8" Joist, 0.0329" minimum thickness.
 2. 800T125-33 - 8" inch runner track, 0.0329" minimum thickness.
- H. Flat Metal Straps and Plates: ASTM A 653; galvanized sheet steel, gage, shape, and configuration as indicated on Drawings.
1. Contractor's Option: In lieu of 2-inch continuous metal strap at capture tracks, Contractor may provide BridgeClip by The Steel Network (888) 474-4876.
 2. Size of straps used for lateral bracing (X-bracing) as indicated on drawings.
- 2.3 FASTENERS
- A. Framing to Framing: ASTM C 954; 5/8 inch Type S-12 low-profile head corrosion-resistant self-drilling self-tapping steel screws.
- B. Framing to Attachment Angle Fasteners: #12 diameter pan head corrosion-resistant self-drilling

self-tapping steel screws.

- C. Wall Floor Track Anchorage Device: Carbon steel wedge type expansion anchor; minimum 3/8 inch diameter x minimum 1-1/2 inch embedment.
 - 1. Kwik Bolt KB II 38-3, by Hilti, Tulsa, OK (800) 879-8000.
 - 2. Thrubolt WS-3822, by ITW Ramset/Red Head, Wood Dale, IL (708) 350-1558.
- D. Wall Furring to Concrete or Masonry Wall Fasteners: Hex head sleeve anchors; minimum 1/4 inch diameter x minimum 1-1/8 inch embedment.
 - 1. Slv Anch HX 5/16X2-1/2, by Hilti, Tulsa, OK (800) 879-8000.
 - 2. Dynabolt HN-1413, by ITW Ramset/Redhead, Wood Dale, IL (708) 350-1558.
- E. Furring Channel to Masonry or Concrete Surface Fasteners: Low velocity powder-actuated drive pins of size to suit application.
- F. Welding Materials: AWS D1.3.
- G. Wood Furring, Blocking, and Plywood, Attached to Framing Fasteners: Specified in Section 06100.

2.4 FINISHES

- A. Galvanizing: G90 coating class.
- B. Primer: SSPC Paint 20, Type I, touch-up for galvanized surfaces.

PART 3- EXECUTION

3.1 EXAMINATION

- A. Examine existing conditions and adjacent areas where products will be installed and verify that conditions conform to product manufacturer's requirements. Verify that building framing components are ready to receive work. Verify that rough-in utilities are in-place and located where required. Do not proceed until unsatisfactory conditions have been corrected.
- B. Beginning of erection indicates acceptance of existing conditions.

3.2 INSTALLATION - STUD FRAMING

- A. Install studs and fasteners in accordance with manufacturer's published instructions and, where gypsum board is attached to studs, install studs in accordance with GA-201 and GA-216.
- B. Metal Stud Spacing: 16 inches on center, maximum, unless otherwise shown on the drawings.
- C. Align stud web openings horizontally.
- D. Construct corners using minimum three studs.
- E. Place studs as indicated on Drawings, minimum 2 inches from abutting walls.
- F. Erect studs one piece full length. Splicing of studs not permitted.
- G. Erect studs, brace, and reinforce to develop full strength to meet design requirements.
- H. Install headers at partition openings using load-bearing cee joists.
- I. Install framing between studs for attachment of mechanical and electrical items.
- J. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- K. Install intermediate studs above and below openings to match wall stud spacing.
- L. Fasten studs adjacent to door and window frames, partition intersections, and corners to top and bottom runner flanges in double-stud fashion with metal lock fastener tools.

1. Securely fasten studs to jamb and head anchor clips of door and borrowed-light frames.
 2. Place horizontally a cut-to-length section of runner with web-flange bent at each end, fasten with minimum one screw per flange.
 3. Position a cut-to-length stud (extending to top runner) at vertical panel joints over door frame header.
- M. Install bridging for stud partitions over 8 feet high at mid-height with 1-1/2 inch rolled channels through studs and screw attach in place using clip angles. Lap channels by nesting one inside the other to a length of at least 8 inches and wire tie together.
- N. Blocking: Screw attach wood blocking between studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, and hardware.
- O. Touch up field welds and damaged galvanized surfaces with primer.
- P. Fastening: Fasten framing in accordance with manufacturer's published instructions and schedule below, unless indicated otherwise on Drawings.

FASTENERS CONNECTION	MINIMUM
Floor Track to Concrete.....	1 Anchor at 36 inches on center.
Partition Stud to Floor Track.....	1 Screw each side at flange.
Stud Web to Stud Web.....	2 Screws.
Plates and Straps to Studs.....	2 Screws.
Lateral Bracing to Partition Stud Using clip Angles.....	2 Screws to stud and 2 Screws to cold rolled channel.
Runner to Header.....	1 Screw at 16 inches on center, maximum 6 inches from each end.
Welded Connections	Indicated on Drawings.

3.3 INSTALLATION - JOIST FRAMING

- A. Install joists and fasteners in accordance with manufacturer's published instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.
- C. Place joists at locations and spacing as indicated on Drawings.
- D. Touch-up field welds and damaged galvanized surfaces with primer.
- E. Fastening: Indicated on Drawings.

3.4 INSTALLATION - CEILING JOISTS

- A. Install joists and fasteners in accordance with manufacturer's published instructions and, where gypsum board is attached to joists, install joists in accordance with GA-201 and GA-216.
- B. Ceiling Joist Spacing: 16 inches on center beginning from center of room unless otherwise shown on the drawings.
- C. Install joists in direction of shortest span, parallel and level, with lateral bracing and bridging.
- D. Install joists in one piece full length. Splicing of joists not permitted.

- E. Install perimeter joist runner track sized to match joists. Attach joist runner track to wall framing with minimum 2 screws per stud and at corners and ends.
- F. Attach joist ends to joist runner tracks with minimum 1 screw each side at each flange.
- G. Install bridging at 48 inches on center beginning from center of room with 1-1/2 inch rolled channels screw attached to joists.

3.5 INSTALLATION – FURRING

- A. Furring Channels: Attach vertically spaced at maximum 16 inches on center, unless otherwise shown on the drawings, to masonry and concrete surfaces with specified powder driven fasteners staggered 24 inches on center on opposite flanges.
- B. Wall Furring:
 - 1. Secure top and bottom runners to structure.
 - 2. Space metal furring at maximum 16 inches on center unless otherwise shown on the drawings.

3.6 CONSTRUCTION

- A. Interface with Other Work:
 - 1. Coordinate erection of studs with hollow metal door frames and overhead coiling door frames.
 - 2. Coordinate installation of anchors, supports, and blocking for mechanical, electrical, and building accessory items installed within framing.
- B. Perform field welding in accordance with AWS D1.3.

3.7 FIELD QUALITY CONTROL

- A. Inspect metal framing erection, placement, spacing, fasteners, welds, and connections to building.
- B. Correct deficiencies in Work which inspection indicates are not in compliance with Contract Documents.

END OF SECTION 05 40 00

SECTION 06 10 00**ROUGH CARPENTRY**

1.1 SUMMARY

A. Section Includes:

1. Wood blocking, cants, and nailers.
2. Wood furring and grounds.
3. Plywood backing panels. Include behind all tenant signage.

B. Related Requirements:

1. Division 06 Section "Rough Carpentry" for elevated decks and other exterior construction made of wood.
2. Division 06 Section "Sheathing."

1.2 SUBMITTALS

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

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSB Board of Review.

D. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Engineered wood products.
4. Power-driven fasteners.
5. Powder-actuated fasteners.
6. Expansion anchors.
7. Metal framing anchors.

1.3 QUALITY ASSURANCE

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

1.4 MATERIALS

A. Wood Products, General:

1. Rough carpentry materials FSC-certified.
2. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness.

B. Wood-Preservative-Treated Lumber:

1. Preservative Treatment: AWPA U1; Use Category UC2, but Use Category UC3b for exterior construction and Use Category UC4a for items in contact with the ground.
 - a. Preservative Chemicals: Containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. Application: Items indicated and as follows:
 - a. Items in contact with roofing or waterproofing.
 - b. Items in contact with concrete or masonry.
 - c. Framing less than 18 inches (460 mm) above ground in crawlspaces.
 - d. Floor plates installed over concrete slabs-on-grade.

C. Fire-Retardant-Treated Materials:

1. Exterior type for exterior locations and where indicated.
2. Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
3. Interior Type A, unless otherwise indicated.
4. Application: Items indicated and as follows:
 - a. Framing for raised platforms.
 - b. Concealed blocking.
 - c. Framing for non-load-bearing partitions.
 - d. Framing for non-load-bearing exterior walls.
 - e. Roof construction.
 - f. Plywood backing panels.

D. Miscellaneous Lumber:

1. Dimension Lumber: Construction or No. 2 grade mixed southern pine.
2. Utility Shelving: 15 percent maximum moisture content.
 - a. White, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling).
 - b. Mixed southern pine, No. 1.
 - c. Hem-fir, Select Merchantable or No. 1 Common.

- d. Spruce-pine-fir, Select Merchantable or No. 1 Common.
 - 3. Concealed Boards: 15 percent maximum moisture content.
 - a. Mixed southern pine, No. 2.
 - b. Hem-fir, Construction or No. 2 Common.
 - c. Spruce-pine-fir, Construction or No. 2 Common.
 - d. Eastern softwoods, No. 2 Common.
 - e. Northern species, No. 2 Common.
 - f. Western woods, Construction or No. 2 Common.
 - E. Plywood Backing Panels: Exterior, AC, fire-retardant treated.
 - F. Fasteners: Hot-dip galvanized steel where exposed to weather, in ground contact, in contact with treated wood, or in area of high relative humidity.
 - G. Metal Framing Anchors:
 - 1. Hot-dip galvanized steel for interior locations.
 - 2. Hot-dip, heavy-galvanized steel for treated lumber and where indicated.
 - 3. Stainless steel for exterior and where indicated.
 - H. Miscellaneous Materials:
 - 1. Sill-Sealer Gaskets: Glass-fiber insulation.
- 1.5 INSTALLATION
- A. Furring to Receive Plywood or Hardboard Paneling: 1-by-3-inch nominal-size (19-by-63-mm actual-size) furring at 24 inches (610 mm) o.c.
 - B. Furring to Receive Gypsum Board or Plaster Lath: 1-by-2-inch nominal-size (19-by-38-mm actual-size) furring at 16 inches (406 mm) o.c.

END OF SECTION 06 10 00

SECTION 06 11 40

WOOD BLOCKING AND CURBING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Roof curbs, cants, and perimeter nailers.
- B. Blocking in wall and roof openings.
- C. Wood furring and grounds.
- D. Concealed wood blocking for support of miscellaneous accessories, wall cabinets wood trim, and miscellaneous hardware decorative moldings.
- E. Preservative treatment of wood.

1.2 RELATED SECTIONS

Not used.

1.3 REFERENCES

- A. ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.
- B. ANSI A208.1 - Mat-Formed Wood Particleboard.
- C. APA (American Plywood Association).
- D. AWWA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.
- E. AWWA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.
- F. NFPA (National Forest Products Association).
- G. WWPA (Western Wood Products Association).

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following agencies:
 - 1. Lumber Grading Agency: Certified by ALSC.
 - 2. Plywood Grading Agency: Certified by APA.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lumber Grading Rules: NFPA, WWPA.
- B. Miscellaneous Framing: Stress Group D species, 19 percent maximum moisture content, pressure preservative treat.

- C. Plywood: APA Structural I, Grade C-D. Exposure Durability 1.
- D. Particleboard: APA rated Oriented Strand Board; wood shavings set with waterproof resin binder.

2.2 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

2.3 FACTORY WOOD TREATMENT

- A. Wood Preservative (Pressure Treatment: AWWA Treatment C1 using water borne preservative with 0.25 percent retainage).
- B. Fire Retardant (Pressure Treatment: AWWA Treatment C20 using waterborne preservative with 0.25 percent retainage).

PART 3 - EXECUTION

3.1 FRAMING

- A. Set members level and plumb, in correct position.
- B. Place horizontal members, crown side up.
- C. Construct curb members of single pieces.
- D. Space framing and furring 16 inches (400 mm) oc.
- E. Curb roof openings, except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- F. Coordinate curb installation with installation of decking and support of deck openings.

3.2 SCHEDULES

- A. Roof Blocking: S/P/F species, 19 percent maximum moisture content, pressure preservative treatment.
- B. Concealed Blocking: S/P/F species, 19 percent maximum moisture content, pressure fire retardant treatment or 3/4 inch (19mm) thick, square edges, site brush applied fire retardant treated.

END OF SECTION 06 11 44

SECTION 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items, other than shop prefabricated casework.
- B. Hardware and attachment accessories.

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Section 06 41 00 - Custom Casework: Installation of recessed wood blocking.

1.3 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 08 11 13 – Hollow Metal Doors and Frames.
- D. Section 08 71 00 - Door Hardware: Supply of hardware and attachment accessories.
- E. Section 10 21 13 - Toilet Compartments.
- F. Section 10 26 00 - Wall and Corner Guards.
- H. Section 10 52 20 - Fire Extinguishers, Cabinets and Accessories.
- I. Section 10 80 00 - Toilet and Bath Accessories.

1.4 RELATED SECTIONS

- A. Section 06 11 40 - Wood Blocking and Curbing: Grounds and support framing.
- B. Section 06 41 00 - Custom Millwork: Shop fabricated custom cabinetwork.
- C. Section 08 14 16 - Flush Wood Doors.
- D. Section 08 80 00 - Glazing: Glass and glazing of wood doors.
- E. Section 09 91 23 – Interior Painting: Painting and finishing of finish carpentry items.

1.5 REFERENCES

- A. ANSI A208.1 - Mat Formed Wood Particleboard.
- B. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- C. AWI - Quality Standards.
- D. AWPA (American Wood Preservers Association) C2 - Lumber, Timbers, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.
- E. AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.

- F. BHMA A156.9 - Cabinet Hardware.
- G. FS MMM-A-130 - Adhesive, Contact.
- H. HPM (Hardwood Plywood Manufacturer's Association) HP - American Standard for Hardwood and Decorative Plywood.
- I. NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates.
- J. NHLA (National Hardwood Lumber Association).
- K. PS 1 - Construction and Industrial Plywood.
- L. PS 20 - American Softwood Lumber Standard.

1.6 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods and jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.

1.7 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Custom quality.

1.8 QUALIFICATIONS

Not Used

1.9 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire retardant requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.
- B. Protect work from moisture damage.

1.11 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.12 COORDINATION

- A. Coordinate the work with plumbing and electrical rough-in, installation of associated and adjacent components.

PART 2 - PRODUCTS

2.1 LUMBER MATERIALS

- A. Softwood Lumber: PS 20; Graded in accordance with AWI Custom.
- B. Hardwood Lumber: Graded in accordance with AWI Custom.

2.2 SHEET MATERIALS

- A. Slotted Wall Sheets.
 - 1. Manufacturing.
 - a. Modern Mfg
 - b. New Directions
 - c. Substitutions: Under provisions of Section 01 60 00.
 - 2. Material
 - a. 4'-0" x 8'-0" x 3/4" solid layered plywood paneling (matte plastic laminated surface).
 - b. Grooves will be 3/8"W x 3/8"D x 3/4"H and reinforced with AT≅ slot aluminum channel on 4" spacing, full length of panel.
 - c. Channel will be mill finished extruded aluminum.
 - d. Slatwall panel will be capable of supporting 125 pounds on shelf in four linear feet, or 60 pounds per waterfall hook in four linear feet.
 - e. Class B
 - f. See finish schedule for color.
 - 3. Special Installation Notes.
 - a. Install with stacked joints.
 - b. Secure slatted wall panels with countersunk, flathead screws with finish to watch insert finish.
- B. Fiberglass Reinforced Panels.
 - 1. Manufacturing.
 - a. Kemlight Company Inc.
 - b. Nudo Products Inc.
 - c. Structoglass Sequentia Corporation.
 - d. Marlite.
 - e. Substitutions: Under provisions of Section 01 60 00.
 - 2. Material.
 - a. 4' x 8', 9' or 10" x 3/32" or 4' x 8' or 10' x 5/8".
 - b. Class A FRP (ASTM E-84).
 - c. Matching corner, base, division and edge moldings.
- C. Laminate Backing Sheet: NEMA LD-3 BK20 backing grade, undecorated plastic laminate.

2.3 ADHESIVE

- A. Adhesive: Type recommended by laminate manufacturer to suit application.

2.4 FASTENERS

- A. Fasteners: Of size and type to suit application; finish in exposed locations.
- B. Concealed Joint Fasteners: Threaded steel.

2.5 ACCESSORIES

- A. Lumber for Shimming and Blocking: Softwood lumber of white pine or cedar species.
- B. Glass: Type as specified in Section 08 80 00.

- C. Primer: Alkyd primer sealer type.
- D. Wood Filler: Oil base, tinted to match surface finish color.

2.6 WOOD TREATMENT PROCESSES

- A. Fire retardant (FR-S Type): Chemically treated and pressure impregnated.
- B. Wood Preservative by Pressure Treatment (PT Type): AWPA Treatment C2 using water borne preservative with 0.25 percent retainage.

2.7 HARDWARE

- A. See Section 08 71 00 - Finish Hardware.

2.8 FABRICATION

- A. Fabricate to AWI Custom standards.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. Cap exposed plastic laminate finish edges with material of same finish and pattern plastic trim.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- E. Apply plastic laminate finish, in full uninterrupted, sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.

2.9 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler, which matches surrounding surfaces and of types recommended for applied finishes.
- D. Seal, stain and varnish exposed to view surfaces. Brush apply only.
- E. Seal, stain and varnish semi-exposed to view surfaces. Brush apply only.
- F. Seal surfaces in contact with cementitious materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- A. Set and secure materials and components in place, plumb and level.
- B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (1 mm). Do not use additional overlay trim to conceal larger gaps.
- C. Install hardware supplied by Section 08 71 00 in accordance with manufacturer's instructions.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch (1.5 mm).
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.7 mm).

END OF SECTION 06 20 00

SECTION 06 40 23**INTERIOR ARCHITECTURAL WOODWORK****1.1 SUMMARY**

- A. Interior standing and running trim.
- B. Plastic-laminate cabinets.
- C. Plastic-laminate countertops.
- D. Plastic-laminate portal at concessionaire in mall.
- E. Closet and utility shelving.
- F. Cabinet hardware and accessories.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated, including cabinet hardware and accessories.
- B. Product Data: For panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, cabinet hardware and accessories.
 - 1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers and other items installed in architectural woodwork.
 - 4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
 - 5. Apply WI-certified compliance label to first page of Shop Drawings.

1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.

- C. Quality Standard: Unless otherwise indicated, comply with AWS's "Architectural Woodwork Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
- D. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.
- E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.4 MATERIALS

- A. General: Provide materials that comply with requirements of AWS's standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Certified Wood: Interior architectural woodwork shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- C. Wood Species for Opaque Finish: Any closed-grain hardwood.
- D. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
 - 1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semiexposed edges.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
- F. Cabinet Hardware and Accessories: Provide materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."
- G. Butt Hinges: 2-3/4-inch (70-mm), 5-knuckle steel hinges made from 0.095-inch- (2.4-mm-) thick metal, and as follows:
 - 1. Semiconcealed Hinges for Flush Doors: BHMA A156.9, B01361.
 - 2. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.
- H. Back-Mounted Pulls: BHMA A156.9, B02011.
- I. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter.

- J. Catches: Magnetic catches, BHMA A156.9, B03141.
- K. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- L. Drawer Slides: BHMA A156.9, B05091.
1. Standard Duty (Grade 1, Grade 2, and Grade 3): Side mounted type; zinc-plated steel with polymer rollers.
 2. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted type; zinc-plated steel ball-bearing slides.
 3. Box Drawer Slides: Grade 1; for drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide.
 4. File Drawer Slides: Grade 1HD-100; for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
 5. Pencil Drawer Slides: Grade 2; for drawers not more than 3 inches (75 mm) high and 24 inches (600 mm) wide.
 6. Keyboard Slides: Grade 1; for computer keyboard shelves.
 7. Trash Bin Slides: Grade 1HD-100; for trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide.
- M. Door Locks: BHMA A156.11, E07121.
- N. Drawer Locks: BHMA A156.11, E07041.
- O. Grommets for Cable Passage through Countertops: 1-1/4-inch (32-mm) OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.
1. Product: Subject to compliance with requirements, provide "OG series" by Doug Mockett & Company, Inc.
- P. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
- Q. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- R. Plastic Laminate Countertops
1. Quality Standard: Comply with AWI Section 400 requirements for countertops.
 - a. Grade: Custom.
 2. Type of Top: High-pressure decorative laminate complying with the following:
 - a. Grade: GP-50, 0.050-inch (1.270-mm) nominal thickness.
 - b. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1) See colors noted in Laminated-Clad Cabinets (plastic-covered casework).
 - c. Edge Treatment: Same as laminate cladding on horizontal surfaces.

d. Core Material: Medium-density particleboard.

S. Laminate-Clad Cabinets (Plastic-Covered Casework)

1. Quality Standard: Comply with AWS Section 11 requirements for laminate-clad cabinets.
 - a. Grade: Custom.
2. AWI Type of Cabinet Construction: Flush overlay.
3. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
 - a. Horizontal Surfaces Other than Tops: GP-50, 0.050-inch (1.270-mm) nominal thickness.
 - b. Vertical Surfaces: GP-28, 0.028-inch (0.711-mm) nominal thickness.
 - c. Edges: GP-28, 0.028-inch (0.711-mm) nominal thickness where noted. 3 mm PVC matching laminate color unless otherwise noted.
4. Materials for Semiexposed Surfaces: Provide surface materials indicated below:
 - a. Surfaces Other than Drawer Bodies: Thermoset decorative overlay.
 - b. Drawer Sides and Backs: Thermoset decorative overlay.
 - c. Drawer Bottoms: Thermoset decorative overlay.
5. Colors, Patterns and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - a. See Finishes Legend and Food Vendor Drawings.

1.5 FABRICATION

- A. Interior Woodwork Grade: Provide interior woodwork complying with the referenced quality standard and of the following grade:
 1. Grade: Custom.
- B. Fabricate woodwork to dimensions, profiles, and details indicated.
- C. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

1.6 INSTALLATION

- A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

- B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
- C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation.
- E. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unnumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Maintain veneer sequence matching of cabinets with transparent finish.
 - 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood framing, blocking, or hanging strips.
- F. Tops: Anchor securely to base units and other support systems as indicated. Caulk space between backsplash and wall with specified sealant.
 - 1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
 - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c.

END OF SECTION 06 40 23

SECTION 06 41 00**CUSTOM MILLWORK**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Special fabricated cabinet units.
- B. Portals at retail entrances (only where noted on drawings to be provided by General Contractor).
- C. Hall of Honor millwork.
- D. Countertops.
- E. Cabinet hardware.
- F. Prefinished surfaces. Preparation for site finishing.
- G. Preparation for installing utilities.

1.2 RELATED SECTIONS

- A. Section 06 11 40 - Wood Blocking and Curbing: Grounds and support framing.
- B. Section 06 20 00 - Finish Carpentry: Related trim not specified in this section.
- C. Section 08 80 00 - Glazing: Glass for casework.
- D. Section 09 91 23 - Painting: Site finishing of cabinet exterior and interior.
- E. Section 22 40 00 - Plumbing Fixtures: Plumbing utilities and fixtures.

1.3 REFERENCES

- A. ANSI A135.4 - Basic Hardboard.
- B. ANSI A208.1 - Mat Formed Wood Particleboard.
- C. AWI (Architectural Woodwork Institute) - Quality Standards.
- D. HPM (Hardwood Plywood Manufacturer's Association) HP - American Standard for Hardwood and Decorative Plywood.
- E. NHLA (National Hardwood Lumber Association).
- F. PS 1 - Construction and Industrial Plywood.
- G. PS 20 - American Softwood Lumber Standard.

1.4 SUBMITTALS FOR REVIEW

- A. Section 01 33 00 - Submittals: Procedures for submittals.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit two, 8 x 10 inch size samples, illustrating cabinet finish and color.
- E. Samples: Submit two, 8 x 10 inch size samples, illustrating counter top finish and color.
- F. Samples: Submit two samples of drawer pulls, hinges, latches and drawer slides, illustrating hardware finish and type.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Custom quality.

1.6 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Material and Equipment: Transport, handle, store, and protect products.
- B. Protect units from moisture damage.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Material and Equipment: Environmental conditions affecting products on site.
- B. During and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers:
 - 1. Wood Mode.
 - 2. Merillat.
 - 3. Modern Made.
 - 4. Substitutions: Refer to Section 01 60 00.

2.2 WOOD MATERIALS

- A. Softwood Lumber: PS 20; graded in accordance with AW I Custom average moisture content of 6 to 8 percent.
- B. Hardwood Lumber: NHLA; graded in accordance with AWI Custom average moisture content of 6 to 8 percent.

2.3 PANEL MATERIALS

- A. Softwood Plywood: PS 1; graded in accordance with AWI, core materials of veneer lumber particleboard.
- B. Hardwood Plywood: PS 51; HPMA; graded in accordance with AWI, core materials of veneer lumber particleboard, type of glue recommended for application.
- C. Wood Particle board: ANSI A208.1; AWI standard, composed of wood chips, medium density, made with high waterproof resin binders water resistant adhesive; of grade to suit application.
- D. Hardboard: ANSI A135.4; Pressed wood fiber with resin binder, standard tempered grade, 1/4 inch thick, smooth one two sides.

2.4 MANUFACTURERS - PLASTIC LAMINATE

- A. Manufacturers:
 - 1. Formica Corporation.
 - 2. Nevamar Corp.
 - 3. Ralph Wilson Plastics Co.
 - 4. Substitutions: Refer to Section 01 60 00.

2.5 LAMINATE MATERIALS

- A. Laminate cladding for exposed surfaces: High pressure decorative laminate complying with the following requirements:
 - 1. Countertops: GP-50.
 - 2. Horizontal surfaces other than tops: GP-50 GP-28.
 - 3. Post formed surfaces: PF-42.
 - 4. Vertical surfaces: GP-50 GP-28.
 - 5. Edges: GP50 GP-28.
- B. Laminate Backing Sheet: 0.020 inch Backing Sheet grade, undecorated plastic laminate or thermoset decorative overlay.
- C. Wood Veneer Laminate: Softwood plywood; PS 1 Grade C-D; Graded in accordance with AWI Custom.

2.6 ACCESSORIES

- A. Adhesive: Type recommended by AWI to suit application.
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.
- D. Concealed Joint Fasteners: Threaded steel.
- E. Grommets: Plastic material for cut-out, Doug Mockett or equal.

2.7 HARDWARE

- A. Shelf Standards and Rests: Formed steel channels and rests, cut for fitted rests spaced at 1 inch (25 mm) centers; chrome satin finish.
- B. Shelf Brackets: Formed steel brackets, formed for attachment with lugs; chrome satin finish.
- C. Drawer and Door Pulls: 4" wire pull, similar to Amerock 76312-260.
- D. Sliding Door Pulls: Oval Elongated shape, brass with polished satin finish, similar to Ives, IVE223B15.
- E. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with chrome satin finish, similar to National, NCL-C8053260-KDMK.
- F. Catches: Magnetic. Touch type.
- G. Drawer Slides: Galvanized steel construction, ball bearings separating tracks, full extension type, auto close, similar to Blum Tandem 562HFX with Blumotion.
- H. Hinges: European style, concealed type, steel with chrome satin finish. Similar to Blum 170° clip-on hinge and base plate.
- I. Sliding Door Track Assemblies: Galvanized steel construction, ball bearing carriers fitted within tracks, multiple pendant suspension attachments for door.

2.9 FINISHING MATERIALS

- A. Stain, Varnish and Finishing Materials: As required by AWI.

2.10 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. Fit shelves, doors, and exposed edges with 3/8 inch (9.5 mm) matching hardwood matching veneer edging. Use one piece for full length only.
- C. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- D. Door and Drawer Fronts: 3/4 inch thick; flush style.
- E. Drawer Boxes: 3/4", 4-sided, dovetail box with 3/16" plywood bottom.
- F. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- G. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes, at corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- H. Apply laminate backing sheet to reverse side of plastic wood laminate finished surfaces.
- I. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint Seal cut edges.

- J. Bottoms and sides of all sink cabinets to be hardwood plywood.

2.11 FACTORY FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler, which matches surrounding surfaces and of types recommended for applied finishes.
- D. Finish work in accordance with AWI Finish System TR-2-catalyzed lacquer or TR-4-conversion varnish.
- E. Prime paint Seal surfaces in contact with cementitious materials.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Set and secure casework in place; rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units counter tops.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32- inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING

- A. Section 01 77 00 - Contract Closeout 01 40 00 - Quality Control: Adjust installed work. Test installed work for rigidity and ability to support loads.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- A. Section 01 77 00 - Contract Closeout: Cleaning installed work.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION 06 41 16

SECTION 07 92 00**JOINT SEALANTS**

1.1 SUMMARY

- A. This Section includes joint sealants for the following locations:
1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
 - a. Control joints in masonry walls.
 - b. Control and expansion joints in cast-in-place concrete.
 - c. Perimeter joints between adjacent materials and frames of doors and windows.
 - d. Other joints as indicated.
 2. Exterior joints in horizontal traffic surfaces as indicated below:
 - a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.
 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Tile control and expansion joints.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors.
 - e. Perimeter joints of plumbing fixtures.
 - f. Other joints as indicated.
 4. Interior joints in horizontal traffic surfaces as indicated below:
 - a. Control and expansion joints in cast-in-place concrete slabs.
 - b. Other joints as indicated.

1.2 PRECONSTRUCTION TESTING

- A. Preconstruction compatibility and adhesion testing.
- B. Preconstruction field-adhesion testing.

1.3 WARRANTY

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

- B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.
- B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

1.5 SUBMITTALS

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

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

1.7 MATERIALS

- A. VOC Content of Interior Sealants:
 - 1. Architectural Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- B. Stain Test: ASTM C 1248.
- C. Suitability for Contact with Food: Comply with 21 CFR 177.2600, where applicable.

1.8 MATERIALS

- A. Mildew-Resistant Silicone Joint Sealant:
1. Type: Single component.
 2. Grade: Pourable.
 3. Class: 100/50.
 4. Uses Related to Exposure: Traffic.
- B. Immersible Urethane Joint Sealant:
1. Type: Single component.
 2. Grade: Pourable.
 3. Class: 100/50.
 4. Uses Related to Exposure: Traffic or immersible.
- C. Immersible Polysulfide Joint Sealant:
1. Type: Single-component
 2. Grade: Pourable.
 3. Class: 25.
 4. Uses Related to Exposure: Traffic or immersible.
- D. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex.
- E. Solvent-Release-Curing Joint Sealant: Acrylic.
- F. Preformed Joint Sealant: Preformed silicone.
- G. Acoustical Joint Sealant: Nonsag, paintable, nonstaining latex.
- H. Joint-Sealant Backing: Cylindrical.

1.9 INSTALLATION

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:
1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - a. Do not leave gaps between ends of joint fillers.
 - b. Do not stretch, twist, puncture, or tear joint fillers.

- c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
 2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
 - E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
 - F. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
 1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
- 1.10 FIELD QUALITY CONTROL
- A. Field-adhesion testing.

END OF SECTION 07 92 00

SECTION 08 31 13**ACCESS DOORS AND FRAMES**

1.1 SUMMARY

A. Section Includes:

1. Access doors and frames for walls and ceilings.
2. Floor access doors and frames.

1.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Vertical Access Doors and Frames: NFPA 252 or UL 10B.
- B. Fire-Rated Horizontal Access Doors and Frames: NFPA 288.

1.3 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with UL Design and Warnock Hersey Design requirements.

1.5 MATERIALS

A. Flush access doors and frames for walls and ceilings.

1. Flanges: Exposed.
2. Material: Steel.

B. Recessed access doors and frames for walls and ceilings.

1. Material: Steel.

C. Aluminum flush access doors and frames for walls and ceilings.

D. Lightweight flush access doors and frames for walls and ceilings.

1. Material: Steel.
- E. Plastic flush access doors and frames for walls and ceilings.
- F. Exterior flush access doors and frames.
1. Material: Metallic-coated steel.
- G. Medium-security flush access doors and frames.
1. Material: Steel.
- H. Fire-rated, flush access doors and frames.
1. Flanges: Exposed.
 2. Fire-Resistance Rating: Match the rating on the wall or ceiling in which the door is installed.
 3. Insulated.
 4. Material: Steel.
- I. Hardware:
1. Hinge: 175 Duree Steel continuous piano hinge.
 2. Lock: (where required). Cylinder lock with latch keyed with building keying system.
- J. Finishes:
1. Aluminum: Mill finish.
 2. Metallic-Coated Steel: Factory prime and Factory finish.
 3. Steel: Factory prime.
 4. Stainless Steel: No. 4 finish.
- 1.6 INSTALLATION
- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in opening. Secure rigidly in place.
- C. Position unit to provide convenient access to concealed work requiring access.
- D. Hard Ceilings: Gypsum board finish type, 18 x 18 inch (600 x 600 mm) size, screwdriver slot lock, primed and one coat baked enamel "White".
- E. Washroom Walls Above Urinal Valves: Ceramic tile finish type, 12 x 12 inch (300 x 300 mm) size, cylinder lock, primed and two coat baked enamel to match ceramic tile color.

- F. Other access doors mounted in wall for human access, 24" wide x 36" high.

END OF SECTION 08 31 13

SECTION 09 22 16**NON-STRUCTURAL METAL FRAMING****1. SUMMARY**

- A. This Section includes non-load-bearing steel framing members for the following applications:
 - 1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
 - 2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

2. SUBMITTALS

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

3. QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate on-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. Sound Transmission Characteristics: For STC-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

4. NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
 - 2. Protective Coating: Manufacturer's standard corrosion-resistant zinc coating, unless otherwise indicated.

5. SUSPENSION SYSTEM COMPONENTS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.
- B. Hanger Attachments to Concrete:
 - 1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to **5** times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
 - a. Type: Postinstalled, expansion anchor.
 - 2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.
- D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.
 - 1. Depth: 1-1/2 inches.

6. STEEL FRAMING FOR FRAMED ASSEMBLIES

- A. Steel Studs and Runners: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: As indicated on Drawings.

- B. Slip-Type Head Joints: Where indicated, provide the following:
1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - b. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Steel Network Inc. The VertiTrack VTD Series.
 - 2) Superior Metal Trim; Superior Flex Track System (SFT).
7. INSTALLATION, GENERAL
- A. Installation Standard: ASTM C 754.
1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
8. INSTALLING SUSPENSION SYSTEMS
- A. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- B. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Do not attach hangers to steel roof deck.
 4. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 6. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- C. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
9. INSTALLING FRAMED ASSEMBLIES

- A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- B. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb, unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 - 6. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.
- C. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 09 22 16

SECTION 09 29 00**GYP SUM BOARD ASSEMBLIES****1. SUMMARY**

- A. This Section includes the following:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.

2. SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

3. QUALITY ASSURANCE

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

4. INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. National Gypsum Company.
 - b. USG Corporation.
- B. Type X:
 - 1. Thickness: 5/8 inch.
 - 2. Long Edges: Tapered.
- C. Abuse-Resistant Type: Manufactured to produce greater resistance to surface indentation and through-penetration (impact resistance) than standard, regular-type and Type X gypsum board.
 - 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.

5. TILE BACKING PANELS

- A. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M or ASTM C 1396/C 1396M. **Use in all Food Concept construction with tile work and FRP work.**
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum Co.
 - b. National Gypsum Company.
 - c. USG Corporation.
 - 3. Core: 5/8 inch, Type X.

6. TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
 - 2. Shapes:

- a. Cornerbead.
- b. Bullnose bead.
- c. LC-Bead: J-shaped; exposed long flange receives joint compound.
- d. L-Bead: L-shaped; exposed long flange receives joint compound.
- e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
- f. Expansion (control) joint.
- g. Curved-Edge Cornerbead: With notched or flexible flanges.

7. JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 1. Interior Gypsum Wallboard: Paper.
 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Pre-filling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 5. Skim Coat: For final coat of Level 4 finish, use drying-type, all-purpose compound
- D. Joint Compound for Tile Backing Panels:
 1. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and settingtype, sandable topping compound.

8. AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

9. APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and

trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

- D. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

10. APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: As indicated on Drawings
 - 2. Abuse-Resistant Type: As indicated on Drawings
 - 3. Moisture- and Mold-Resistant Type: As indicated on Drawings

11. APPLYING TILE BACKING PANELS

- A. Water-Resistant Gypsum Backing Board: Install at showers, tubs, and where indicated. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
- C. Areas Not Subject to Wetting: Install regular-type gypsum wallboard panels to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.
- D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

12. INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
 - 2. Bullnose Bead: Use where indicated.
 - 3. LC-Bead: Use at exposed panel edges.
 - 4. Curved-Edge Cornerbead: Use at curved openings.

13. FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile or FRP panels.
 - 3. Level 3: N/A.
 - 4. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.
 - 5. Level 5: Where indicated on Drawings.

- a. Primer and its application to surfaces are specified in other Division 09 Sections.
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

14. APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

15. PROTECTION

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

END OF SECTION 09 29 00

SECTION 09 30 00**TILING****PART 1 - GENERAL**

1.1 SUMMARY

- A. This Section includes porcelain and ceramic tile products on walls and floors in toilet and locker rooms. Substrates include cementitious backer board and concrete masonry at walls and at floors, concrete slabs-on-grade and suspended concrete slabs. Materials include the following:
1. Porcelain tile.
 2. Glazed wall tile.
 3. Elastomeric Joint Sealant in tile fields.
 4. Tile cleaner and sealer.
 5. Mortar & Grout.
- B. Related Sections include the following:
1. Division 3 Section "Cast-In-Place Concrete" for slab finishes specified for tile over concrete substrates.

1.2 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
1. Level Surfaces: Minimum 0.6.

1.3 SUBMITTALS

- A. Product Data: For each type of tile, mortar, grout, and other products specified.
- B. Grout Samples for Initial Selection: Manufacturer's color charts consisting of actual sections of grout showing the full range of colors available for each type of grout indicated.
- C. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.
1. Each type and composition of tile and for each color and texture required, at least 12 inches (300 mm) square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Architect.
 2. Full-size units of each type of trim and accessory for each color required.
 3. Stone thresholds in 6-inch (150-mm) lengths.
 4. Metal edge strips in 6-inch (150-mm) lengths.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.
- C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:
 - 1. Cementitious backer units.
 - 2. Joint sealants.
 - 3. Waterproofing.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

1.7 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.
 - 2. Obtain a written receipt from the Owner's Representative, to include in Closeout Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Basis of Specification is Dal Tile Company, American Olean and Crossville Ceramics products indicated in the ceramic tile installation schedules in the Finishes Legend located at the end of the Finish Schedule.

- B. Manufacturers: Subject to compliance with requirements, and properties of the specified products, including color selection, products by the following will be considered if submitted before Bids are received in accordance with the Instructions to Bidders:

1. Tile Products:

- a. American Marrazzi Tile, Inc.
- b. American Olean Tile Co.
- c. Dal-Tile Corporation.
- d. Florida Tile Industries, Inc.
- e. Mannington Ceramic Tile.
- f. Monarch Tile, Inc.
- g. Quarry Tile Company.
- h. United States Ceramic Tile Company.

2. Tile-Setting and -Grouting Materials:

- a. American Olean Tile Company.
- b. Custom Building Products.
- c. Dal-Tile Corporation.
- d. DAP, Inc.
- e. Laticrete International, Inc.

2.2 PRODUCTS, GENERAL

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

1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.

- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.

- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. Match colors, textures, and patterns indicated by referencing manufacturer's standard designations for these characteristics.
2. Provide tile trim and accessories as indicated in the Schedule.

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

- E. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.

2.3 TILE PRODUCTS

- A. Porcelain Floor Tile: Provide flat tile complying with the following requirements:

1. See Finishes Legend and Schedule for description and location.

- B. Glazed Wall Tile: Provide flat tile complying with the following requirements:
1. See Finishes Legend and Schedule for description and location.
- C. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:
1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
 2. Shapes: As indicated on the Drawings or if not indicated, as follows, selected from manufacturer's standard shapes:
 - a. Provide coved base at unglazed floor tile.
 - b. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
 - c. External Corners for Thin-Set Mortar Installations: Surface bullnose.
 - d. Internal Corners: Field-buffed square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.
 - e. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide a reduction in thickness from 1/2 to 1/4 inch (12.7 to 6.35 mm) across nominal 4-inch (100-mm) dimension.

2.4 SETTING MATERIALS

- A. Portland Cement Mortar Installation Materials: Provide materials complying with ANSI A108.1A and as specified below:
1. Latex additive (water emulsion) described below, serving as replacement for part or all of gaging water, of type specifically recommended by latex additive manufacturer for use with job-mixed Portland Cement and aggregate mortar bed.
 - a. Latex Additive: Manufacturer's standard.
- B. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:
1. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of Portland Cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.
 - a. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.

2.5 GROUTING MATERIALS

- A. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:
1. Factory-Prepared, Dry-Grout Mixture: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to produce the following:
 - a. Unsanded grout mixture for joints 1/8 inch (3.2 mm) and narrower.
 - b. Color: See Finish Schedule.

- B. Floor Grout: Two-component, chemical resistant, non-saging epoxy grout which is water cleanable; grout shall comply with ANSI A118.3. Colors as indicated on Finishes Legend and Food Vendor Drawings. The following manufacturers and products are approved:
1. Laticrete International "Latapoxy SP-100 Stainless Epoxy Grout (Series 700)".
 2. Mapei, Inc. "Kerapoxy 400 100% Solids Epoxy Grout".
 3. Bostik Construction Products "Hydroment Colo-Poxy".

2.6 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."
- B. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.
1. Provide at joints of ceramic wall tile and ceiling surface, around pipe penetrations, plumbing fixtures and trim.
 2. Provide at perimeter of toilet room accessories such as grab bars, towel bars, paper and soap dispensers provided on or within walls in accordance with UBC, 1997 Edition, Section 807.1.2
- C. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
1. Provide at control joints in floors where indicated, or if not indicated, over control joints in substrates and at 30-foot maximum spacing.
- D. Products: Subject to compliance with requirements, provide one of the following:
1. One-Part, Mildew-Resistant Silicone Sealants:
 - a. Dow Corning 786; Dow Corning Corporation.
 - b. Sanitary 1700; GE Silicones.
 - c. Pecora 898 Sanitary Silicone Sealant; Pecora Corp.
 - d. Rhodorsil 6B White; Rhone-Poulenc, Inc.
 - e. Tremsil 600 White; Tremco, Inc.
 2. Multipart, Pourable Urethane Sealants:
 - a. Chem-Calk 550; Bostik.
 - b. Vulkem 245; Mameco International, Inc.
 - c. NR-200 Urexpan; Pecora Corp.
 - d. THC-900; Tremco, Inc.

2.7 MISCELLANEOUS MATERIALS

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

- B. Metal Edge Strips: White-zinc-alloy terrazzo strips, 1/8 inch (3.2 mm) wide at top edge with integral provision for anchorage to mortar bed or substrate, unless otherwise indicated.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Tile Sealer: Aqua Mix "Sealer's Choice 15 Gold."
 - 1. Description: No-sheen, water-based penetrations sealer.
 - 2. Application: Two coats in accordance with manufacturer's recommendations.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
 - 2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 - 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.

1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
2. Remove protrusions, bumps, and ridges by sanding or grinding.

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

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
1. For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots (if indicated) to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Locate joints in tile surfaces directly above joints in concrete substrates.
 2. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
- H. Grout tile to comply with the requirements of the following tile installation standards:
1. For ceramic tile grouts (sand-portland cement, dry-set, commercial Portland Cement, and latex-Portland Cement grouts), comply with ANSI A108.10.

3.4 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.
- B. Joint Widths: Install tile on floors with the following joint widths:
 - 1. Unglazed Ceramic Tile: 1/4 inch.
- C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.5 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Ceramic Tile Wall Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Install tile on walls with the following joint widths:
 - 1. Wall Tile: 1/4 inch.
- C. For exterior corners at food concessions, see Det B2/Sht. A-501.

3.6 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove latex-portland cement grout residue from tile as soon as possible.
 - 2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure tile is without damage or deterioration at the time of Substantial Completion.
 - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
 - 2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.7 CERAMIC TILE INSTALLATION SCHEDULE

- A. Ceramic Tile Floor Installation. Comply with the following:

1. Tile Type: Unglazed ceramic tile over concrete slabs. Provide products according to the Finishes Legend at the end of the Finish Schedule.
 2. Provide according to TCA Installation Method F113, Thinset.
 - a. Latex Portland Cement mortar, ANSI A118.4.
 - b. Latex Portland Cement grout, ANSI A118.6.
- B. Ceramic Wall Tile over Cementitious Backer Units: Comply with the following:
1. Tile Type: Ceramic wall tile. Provide products according to the Finishes Legend at the end of the Finish Schedule.
 2. Provide according to TCA Installation Method W244.
 - a. Latex Portland cement mortar, ANSI A118.4.
 - b. Latex Portland cement grout, ANSI A118.6.

END OF SECTION 09 30 00

SECTION 09 51 23**SUSPENDED ACOUSTICAL LAY-IN CEILINGS**

1. SUMMARY
 - A. This Section includes acoustical tiles and concealed suspension systems for ceilings.
2. SUBMITTALS
 - A. Product Data: For each type of product indicated.
 - B. Coordination Drawings: Drawn to scale and coordinating acoustical tile ceiling installation with hanger attachment to building structure and ceiling mounted items. Show size and location of initial access modules.
 - C. Samples: For each exposed finish.
 - D. Product test reports.
 - E. Maintenance data.
3. QUALITY ASSURANCE
 - A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP accredited laboratory.
 - B. Fire-Test-Response Characteristics:
 1. Fire-Resistance Characteristics: Where indicated, provide acoustical tile ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - a. Identify materials with appropriate markings of applicable testing and inspecting agency.
 2. Surface-Burning Characteristics: Acoustical tiles complying with ASTM E 1264 for Class A materials, when tested per ASTM E 84.
 - a. Smoke-Developed Index: 450 or less.
 - C. Seismic Standard: Comply with the following:
 1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
4. EXTRA MATERIALS
 - A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Acoustical Ceiling Units: Full-size tiles equal to 5.0 percent of quantity installed.
 2. Suspension System Components: Quantity of each concealed grid and exposed component equal to 2.0 percent of quantity installed.
5. ACOUSTICAL TILE CEILINGS, GENERAL
 - A. Acoustical Tile Standard: Comply with ASTM E 1264.
 - B. Metal Suspension System Standard: Comply with ASTM C 635.
 - C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
 - D. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 1. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.
 - E. Seismic struts and seismic clips.
 - F. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic

design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

6. **ACOUSTICAL TILES FOR ACOUSTICAL TILE CEILING**
 - A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - B. Products: Subject to compliance with requirements, provide one of the following:
 1. USG Interiors, Inc.; "Fissured", Square.
 - C. Classification: Provide tiles complying with ASTM E 1264 for type and form as follows:
 1. Type III, Form 4, Pattern D
 - D. Color: White.
 - E. LR: Not less than 0.83.
 - F. CAC: Not less than 35.
 - G. AC: N/A.
 - H. Edge/Joint Detail: Square.
 - I. Thickness: 3/4 inch.
 - J. Modular Size: 24 inches by 24 inches & 24 inches by 48 inches. See Architectural Plans for Locations. Some Locations indicate tile to be replaced only.
7. **METAL SUSPENSION SYSTEM FOR ACOUSTICAL TILE CEILING**
 - A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - B. Products: Subject to compliance with requirements, provide one of the following:
 1. USG Interiors, Inc.; "Donn DX"
 - C. Direct-Hung Suspension System: Intermediate-duty structural classification.
8. **INSTALLATION**
 - A. Comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
 - B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders.
 - C. Suspend ceiling hangers from building's structural members, plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers, use trapezes or equivalent devices. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 1. Do not support ceilings directly from permanent metal forms or floor deck; anchor into concrete slabs.
 2. Do not attach hangers to steel deck tabs.
 - D. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with
 - E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
 - F. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.

END OF SECTION 09 51 23

SECTION 09 65 13**RESILIENT WALL BASE AND ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes the following:
 - 1. Resilient wall base.
- B. Related Sections include the following:
 - 1. Division 9 Section "Resilient Tile Flooring."

1.2 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Samples for Verification: In manufacturer's standard sizes, but not less than 12 inches (300 mm) long, of each product color and pattern specified.
- C. Product Certificates: Signed by manufacturers of resilient wall base and accessories certifying that each product furnished complies with requirements.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.
- B. Source Limitations: Obtain each type and color of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.
- C. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.
 - 2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

- B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F (10 and 32 deg C).
- C. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.5 PROJECT CONDITIONS

- A. Maintain a temperature of not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive resilient products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After postinstallation period, maintain a temperature of not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
- B. Do not install products until they are at the same temperature as the space where they are to be installed.
- C. For resilient products installed on traffic surfaces, close spaces to traffic during installation and for time period after installation recommended in writing by manufacturer.
- D. Coordinate resilient product installation with other construction to minimize possibility of damage and soiling during remainder of construction period. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design product is Johnsonite wall base. Color as indicated in the Finish Legend. Subject to compliance with Division 1 Requirements, and this specification section, products from other manufacturer's may be considered.

2.2 RESILIENT WALL BASE

- A. Rubber Wall Base: Products complying with FS SS-W-40, Type I and with requirements specified by reference to manufacturers product as listed.
 - 1. Color and Pattern: See Finishes Legend.
 - 2. Style: Cove with top-set toe.
 - 3. Minimum Thickness: 1/8 inch (3.2 mm).
 - 4. Height: 4 inches (101.6 mm).
 - 5. Lengths: Cut lengths 48 inches (1219.2 mm) long or coils in lengths standard with manufacturer, but not less than 96 feet (29.26 m).
 - 6. Outside Corners: Job formed.
 - 7. Inside Corners: Job formed.
 - 8. Surface: Smooth.

2.3 RESILIENT ACCESSORIES

- A. Rubber Accessories: Products complying with requirements specified below.
- B. Color and Pattern: As selected by Architect from manufacturer's full range of colors and patterns produced for resilient accessories complying with requirements indicated.
- C. Product Types: Provide resilient accessories for the project including but not limited to the following types:
 - 1. Reducer strip for resilient flooring.

2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by resilient product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements, including those for maximum moisture content. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Broom and vacuum clean substrates to be covered immediately before installing resilient products. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. General: Install resilient products according to manufacturer's written installation instructions.

- B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
 - 1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
 - 2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 - 3. Do not stretch base during installation.
 - 4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
 - 5. Form outside corners on job, from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 6. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.
- C. Place resilient products so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.
- D. Apply resilient products to stairs as indicated and according to manufacturer's written installation instructions.

3.4 EXCESS MATERIALS AND WASTE

- A. Recycling: Separate and recycle all waste materials in accordance with the Contractor's waste management plan and to the extent economically feasible. This includes metal banding, pallets, and other shipping materials in addition to waste resulting from installation operations.

3.5 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing resilient products:
 - 1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
 - 2. Sweep or vacuum horizontal surfaces thoroughly.
 - 3. Do not wash resilient products until after time period recommended by resilient product manufacturer.
 - 4. Damp-mop or sponge resilient products to remove marks and soil.
- B. Protect resilient products against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by resilient product manufacturer.
 - 1. Cover resilient products installed on floors with undyed, untreated building paper until inspection for Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 72 00**WALL COVERINGS****PART 1 - GENERAL**

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Vinyl wall covering.
- B. Related Sections include the following:
 - 1. Division 9, Section "Gypsum Board" for gypsum board assemblies.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.
- B. Shop Drawings: Show location and extent of each wall-covering type. Indicate seams and termination points.
- C. Samples for Verification: Full width by 36-inch- (1000-mm-) long section of wall covering from dye lot to be used for each type of wall covering indicated for each color, texture, and pattern required.
- D. Schedule: For wall coverings. Use same designations indicated on Drawings.
- E. Maintenance Data: For wall coverings to include in maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide wall coverings and adhesives with the following fire-test-response characteristics as determined by testing identical products applied with identical adhesives to substrates per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Surface-Burning Characteristics: As follows, per ASTM E 84:
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - c. Fire Rating: Class A.
- B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate appearance and aesthetic effects and set quality standards for installation.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install wall coverings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install wall covering until a lighting level of not less than 15 fc (160 lux) is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Rolls of Wall-Covering Material: Full-size units equal to 5 percent of amount of each type installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Basis of this Specification, including color, is indicated in the Finishes Legend at the end of the Finish Schedule. Subject to compliance with the requirements and properties of the product listed, including acceptable color and texture, products of other manufacturers will be considered if submitted prior to Bid in accordance with the stipulations in the Instructions to Bidders.

2.2 WALL-COVERING PRODUCTS

- A. General: Provide rolls of each type of wall covering from the same run number or dye lot.
- B. Location: See Finishes Legend and Finish Schedule for location of vinyl wall covering.

2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application, as recommended in writing by wall-covering manufacturer.
- B. Metal Primer: Interior ferrous metal primer complying with Division 9 Section "Painting (Professional Line Products)."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of work.

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

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair wall covering's bond, including mold, mildew, oil, grease, incompatible primers, dirt, and dust.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete and concrete masonry units when tested with an electronic moisture meter.
 - 2. Metals: If not factory primed, clean and apply metal primer.
 - 3. Gypsum Board: Prime with primer recommended by wall-covering manufacturer.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION

- A. General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
- D. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.
- E. Match pattern 72 inches (1830 mm) above the finish floor.
- F. Install seams vertical and plumb at least 6 inches (150 mm) from outside corners and 6 inches (150 mm) from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.
- G. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.
- H. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

3.4 CLEANING

- A. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.

- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

SECTION 09 91 23**INTERIOR PAINTING****1. SUMMARY**

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Concrete masonry units (CMU).
 - 2. Steel.
 - 3. Wood.
 - 4. Gypsum board.
 - 5. Plaster.

2. SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each finish and for each color and texture required.
- C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

3. QUALITY ASSURANCE

- A. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft..
 - b. Other Items: Architect will designate items or areas required.
 - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 - 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

4. EXTRA MATERIALS

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

5. PAINT, GENERAL

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

- B. Chemical Components of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions; these requirements do not apply to primers or finishes that are applied in a fabrication or finishing shop:
1. Flat Paints and Coatings: VOC content of not more than 50 g/L.
 2. Nonflat Paints and Coatings: VOC content of not more than 150 g/L.
 3. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 4. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein.
 - b. Acrylonitrile.
 - c. Antimony.
 - d. Benzene.
 - e. Butyl benzyl phthalate.
 - f. Cadmium.
 - g. Di (2-ethylhexyl) phthalate.
 - h. Di-n-butyl phthalate.
 - i. Di-n-octyl phthalate.
 - j. 1,2-dichlorobenzene.
 - k. Diethyl phthalate.
 - l. Dimethyl phthalate.
 - m. Ethylbenzene.
 - n. Formaldehyde.
 - o. Hexavalent chromium.
 - p. Isophorone.
 - q. Lead.
 - r. Mercury.
 - s. Methyl ethyl ketone.
 - t. Methyl isobutyl ketone.
 - u. Methylene chloride.
 - v. Naphthalene.
 - w. Toluene (methylbenzene).
 - x. 1,1,1-trichloroethane.
 - y. Vinyl chloride.
 5. Colors: As indicated in color schedule. See attached Materials Book See attached Materials book Exhibit "B"
6. BLOCK FILLERS
- A. Interior/Exterior Latex Block Filler: MPI #4.
 1. VOC Content: E Range of E2.
7. PRIMERS/SEALERS
- A. Interior Latex Primer/Sealer: MPI #50.
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 1.
 - B. Interior Alkyd Primer/Sealer: MPI #45.
 1. VOC Content: E Range of E1.
8. METAL PRIMERS
- A. Rust-Inhibitive Primer (Water Based): MPI #107.
 1. VOC Content: E Range of E1.

2. Environmental Performance Rating: EPR 1.
 - B. Waterborne Galvanized-Metal Primer: MPI #134.
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 1.
9. WOOD PRIMERS
 - A. Interior Latex-Based Wood Primer: MPI #39.
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 1.
10. LATEX PAINTS
 - A. Interior Latex (Flat): MPI #53 (Gloss Level 1).
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 0.5.
 - B. Interior Latex (Low Sheen): MPI #44 (Gloss Level 2).
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 1.
 - C. Interior Latex (Eggshell): MPI #52 (Gloss Level 3).
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 1.
 - D. Interior Latex (Satin): MPI #43 (Gloss Level 4).
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 1.5.
 - E. Interior Latex (Semigloss): MPI #54 (Gloss Level 5).
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 2.
 - F. Interior Latex (Gloss): MPI #114 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).
 1. VOC Content: E Range of E1.
 2. Environmental Performance Rating: EPR 2.
11. QUICK-DRYING ENAMELS
 - A. Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).
 1. VOC Content: E Range of E1.
 - B. Quick-Drying Enamel (High Gloss): MPI #96 (Gloss Level 7).
 1. VOC Content: E Range of E1.
12. FLOOR COATINGS
 - A. Interior/Exterior Clear Concrete Floor Sealer (Water Based): MPI #99.
 1. VOC Content: E Range of E1.
13. EXAMINATION
 - A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
 - B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMU): 12 percent.
 3. Wood: 15 percent.
 4. Gypsum Board: 12 percent.
 5. Plaster: 12 percent.
 - C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
14. PREPARATION AND APPLICATION
- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
 - B. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
 - C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
 - D. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces as indicated on Mechanical Drawings.
 - E. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
 - F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 09 91 23

SECTION 10 14 00**INTERIOR SIGNAGE****PART 1 - GENERAL**

1.1 SUMMARY

- A. This Section includes the following:
 - 1. ADA Room Identification Signage (Panel signs).

1.2 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
- B. Product data from each manufacturer for each type of product specified, including construction details relative to materials, dimensions of individual components, profiles, finishes and accessories for each type of sign and dimensional letter and number required.
- C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include elevations and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details. Provide text for each sign required, including large scale details of wording and layout of lettering.
- D. Panel sign samples: Provide one full size sample of each type of sign specified for initial selection of color, pattern and surface texture required. On each panel include a representative example of the graphic image process required, showing graphic style, colors and finishes of letters, numbers and other graphic devices as required and for verification of compliance with requirements indicated.
- E. Dimensional letters and number samples: Provide full-size representative sample of each dimensional letter type required, showing letter style, color, and material finish and method of attachment, as required and for verification of compliance with requirements indicated.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.
- B. Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

1.4 MATERIALS

- A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
1. Produce smooth, even level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally.
 2. Text shall be centered at top of signs, with symbol centered.
 3. Braille shall be produced by extracting the background of the plaque using a photo etching process, leaving the copy and braille raised. The plaque shall then be laminated to an opaque acrylic base, cut to size and finished with a professional surface painted acrylic polyurethane enamel in a specified color. The photo etched plaque shall have raised Grade 2 Braille, meeting both ADA and ANSI guidelines.

1.5 FABRICATION

- A. Signs: Plaque face; 1/32" raised copy, integral copy/Braille, 1/8" thick opaque acrylic base. Comply with ADA.
1. Raised Copy: Produced by photo mechanical etching process.
 2. Plaque background color to be Interface #5 Slate.
 3. Plaque face shall be laminated to 1/8" thick opaque acrylic base.
 4. Text, logos, and border design, precision cut, 1/32" minimum thickness, black or white, polyurethane enamel finish, upper case. Helvetica medium style, shall be chemically welded to the face of the plaque.
 5. Edge Condition: Beveled.
 6. Corner Condition: Radiused.

1.6 SIGN TYPES

- A. ADA, text, Braille text and symbol as indicated, 8-3/4" x 8-3/4", plaque.
1. Men/Women with universal symbols and universal accessibility symbol.
 2. "Keep This Door Unlocked During Business Hours".
 3. "Maximum Occupancy:

1.7 INSTALLATION

- A. General: Locate signs and dimensional letter units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
1. Install signs and dimensional letters level, plumb, and at the height indicated and free from distortion or other defects in appearance, with sign surfaces free from distortion or other defects in appearance.
- B. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces. Use silastic adhesive for irregular or porous surfaces or where sign occurs on a vinyl covered surface.

Provide signs on wall adjacent to latch side of door, centered 60" above finish floor unless otherwise noted.

1. Mount sign so that a person may approach within 3" of sign without encountering protruding objects or standing within the swing of a door.
 2. Signs at exterior entrances shall be installed adjacent to the entrance as directed by AAFES.
- C. Dimensional letters: Installed with manufacturer's recommended spacing, align all letters with each other, level and plumb.
- 1.8 CLEANING AND PROTECTION
- A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by AAFES.

END OF SECTION 10 14 25

SECTION 10 26 00**WALL AND DOOR PROTECTION****1.1 SUMMARY**

- A. This Section includes the following types of wall surface protection systems:
1. Wall protection systems, include, Contractor Furnished Contractor installed.
 - a. Corner guards. Provide stainless steel corner guards at all outside corners at Food Court and food concepts.
 - b. Cart bumper rails.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Handrails to resist uniform load of 50 lbf/ft. (0.73 kN/m) and concentrated load of 200 lbf (0.89 kN), not applied concurrently.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.
- B. Shop Drawings: For each impact-resistant wall protection unit showing locations and extent. Include sections, details, and attachments to other work.
1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 WARRANTY

- A. Materials and Workmanship: Five years.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Division 01 Section "Quality Requirements."
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

- D. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Deterioration of plastic and other materials beyond normal use.
 2. Warranty Period: Five years from date of Substantial Completion.

1.7 PRODUCTS

A. Wall Guards:

1. Plastic Crash Rail: With continuous retainer.
 - a. Surface mounted.
2. Plastic Bumper Rail: With continuous retainer.
 - a. Surface mounted.

B. Corner Guards:

1. Surface-Mounted, Resilient, Plastic Type: 4 feet (1.2 m) high, using one-piece aluminum retainer.
2. Flush-Mounted, Resilient, Plastic Type: 4 feet (1.2 m) high, using one-piece aluminum retainer.
3. Fire-rated, resilient, plastic type.
4. Surface-mounted, opaque-plastic type.
5. Surface-mounted, transparent-plastic type.
6. Surface-Mounted, Metal Type: Stainless steel.

END OF SECTION 10 26 00

SECTION 11 13 20**TV MOUNTING BRACKETS**

GENERAL: Provide TV Mounting Brackets at 4 locations in the Food Court and Marketplace areas.

1. SUMMARY
 - a. This section includes ceiling mounted TV mounting brackets and all accessories required for installation.
2. SUBMITTALS
 - a. Product Data: For each type of TV mounting bracket specified. Include details of construction relative to materials, fabrication, installation, anchors, hardware and fastenings.
 - b. Shop Drawings: For installation of TV mounting brackets. Include plans, sections, details and attachment to other work.
3. PROJECT CONDITIONS
 - a. Field Conditions: Verify dimensions and existing conditions in area of installation. Coordinate installation with construction progress to avoid delaying the work.
4. TV MOUNTING BRACKET
 - a. Provide and install ceiling mounted TV mounting brackets, Bretford Yoke style, mount where indicated. Other Manufacturers with products of same design, function and performance are acceptable.
 - i. Model: TVCC 3027-BK
 - ii. Color/Finish: Black powder paint finish.
 - iii. Yoke: 14 and 12 gauge steel.
 - iv. Tilt/Swivel: 0 – 30 degree forward tilt and 360 swivel.
 - b. Mounting Accessories: Provide mounting brackets and extension pipes as required:
 - i. Extension Pipes: Custom exact-length pipe, 1-1/2" NPS.
 - ii. Coiling Mount Adapter: TVUCA-BK
 - iii. Stabilizing Bracket: TVSTBL-BK (2 per mount).
5. INSTALLATION
 - a. Install TV mounting brackets according to manufacturer's instructions, using mounting accessories and anchors as required. Install brackets plumb and firmly anchored at locations indicated.
6. ADJUSTING AND CLEANING
 - a. Adjust TV mounting bracket as required for proper mounting and operation. Verify that brackets are adjustable for tilt and swivel.
 - b. Clean and polish all exposed surfaces according to manufacturer's recommendations after removing all temporary labels.

END OF SECTION 11 13 20

SECTION 11 41 00**INSTALLATION OF FOOD EQUIPMENT**

1. Related documents
 - a. Refer to Drawings of Equipment Plan and Schedule located on drawing sheets.
 - b. **GC to install all food equipment at Dunkin Donuts.**
2. SCOPE
 - a. This section covers the installation as required in conjunction with food equipment.
 - b. Construct all wall openings and sleeves as required in conjunction with food equipment.
 - c. Furnishings and installing all reinforcing construction on walls, slabs, ceilings or floors including all miscellaneous metal supports, angles, plates, anchors, bolts, etc., to firmly secure food equipment in place.
 - d. General clean up and removal of shipping crates for AAFES separate contractors.
3. Related
 - a. Mechanical valves, piping, services and connections in conjunction with food equipment. Refer to drawings and Division 15 sections.
 - b. Electrical switches, disconnects, wires, conduits, plugs, starters and fuses in conjunction with food equipment. Refer to drawings and Division 16 sections.
4. General
 - a. Food service equipment items will be of the sizes and types shown on the drawings and shall be installed as indicated and specified. Equipment shall be installed in accordance with National Sanitation Foundation Standards. Where items are required to fit spaces in previously constructed areas or surfaces are to be built to accommodate equipment, measurements shall not be taken from drawings provided by AAFES.
5. Plumbing connections to equipment
 - a. All plumbing connections to equipment shall conform to the requirements of Section 23 00 39 – Plumbing, the National Plumbing Code and Applicable Standards of Federal Specifications. Service piping and final connections to food equipment are included in Division 22 Sections – Plumbing.
6. Electrical connections to equipment
 - a. Conformance to Underwriters Laboratories, Inc., Standards: Electrically operated equipment shall be connected in accordance with the National Electric Code and applicable standards of the Underwriters Laboratories, Inc. wherever standards have been established by that agency.
 - b. Electrical Work: All manual or automatic control, protective and signal devices required for the operation of the food equipment shall be furnished and installed by the Contractor. Electrical work and final electrical connections to the equipment are included in Division 16 Sections.
7. Shop drawings
 - a. An accurately dimensioned roughing-in drawing indicating all outlets, junction boxes, connections, etc., required, with measurements given from walls and columns shall be furnished by the Contractor to the Contracting Officer.

END OF SECTION 11 41 00

SECTION 23 00 01**GENERAL PROVISIONS - MECHANICAL****PART 1 - GENERAL****1.1 SCOPE OF WORK:**

- A. The work covered by this Division of the Specifications comprises the furnishing of all labor, materials, transportation, tools and appliances and in performing all operations in connection with the installation of the mechanical and plumbing systems in accordance with the applicable drawings and the material contained herein, and subject to the terms and conditions of the contract.
- B. Provide labor and materials, equipment and transportation required to receive, install, adjust and put into operation systems, components of systems, and individual items of equipment, and work related thereto, in accordance with the project documents. Provide products not mentioned but obviously necessary to the completion of this work.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. The Architectural, Civil and Structural Plans and Specifications, including Division 1, the General Conditions and all supplements issued thereto, Information to Bidders, solicitation documents and other pertinent documents issued by the Architects, are a part of these specifications and the accompanying Mechanical and Electrical Plans, and shall be complied with in every respect. All the above is included herewith, will be issued separately or is on file at the Contract Officer's office and shall be examined by all bidders. Each bidder on any portion of the work under this Division shall examine the Architectural, Structural and Electrical Plans and Specifications and all Addenda issued. Failure to comply shall not relieve the Bidder of any responsibility. The omission of the Architectural, Structural and Electrical details from the Mechanical Drawings shall not be used as a basis for a request for additional compensation.

1.3 WORK INCLUDED:

- A. This section applies to, and is a part of each of the following sections of the specifications as if repeated therein verbatim. Provisions of this section shall apply to the work performed for installation of:
 - 1. Piping and accessories
 - 2. Ductwork and accessories
 - 3. Mechanical insulation
 - 4. Vibration isolation
 - 5. Plumbing
 - 6. Heating-ventilating-cooling
 - 7. Instrumentation and controls
 - 8. General requirements for electrical work
- B. Work specified in the "General Requirements for Electrical Work" section is included in this section in each applicable part required for trade coordination as if repeated herein verbatim.
- C. The documents consist, for convenience, of several sections. Review and become familiar with each section of the contract documents, and include applicable portions of the work whether specifically mentioned or not.

- D. The drawings and the specifications are numbered consecutively. The Prime Contractor shall check the drawings and specifications thoroughly and shall notify the Architect of any discrepancies or omissions of sheets or pages. Upon notification, the Architect will promptly provide the Prime Contractor with any missing portions of the drawings or specifications. No discrepancies or omissions of sheets or pages of the contract documents will relieve the Prime Contractor of his duty to provide all work required by the complete contract documents.
- E. Each bidder shall assume full responsibility for having complete knowledge of the site, including existing structures and facilities thereon, and of the architectural, structural, mechanical and electrical drawings, and their related specifications. Should information be needed and should this information not be available, notify the Architect of this situation sufficiently in advance of such need that the acquisition or preparation of such information will not unduly delay progress of construction.
- F. The Prime Contractor, all other contractors, and all sub-contractors shall cooperate with all trades so as to facilitate the general progress of the work. Each trade shall afford all other trades every reasonable opportunity for the installation of their work and the storage of their materials. The Mechanical and Electrical Contractors shall follow the general building construction closely, set all pipe sleeves, inserts, etc., and see to it that openings for chases, pipes, ducts, etc., are provided before concrete is placed or masonry installed. Unless otherwise noted, the various sub-contractors shall bring the required services to the equipment items furnished by others for convenient connections by the proper trade.
- G. The work under the various sections must be expedited and close coordination will be required in executing the work. The various contractors shall perform their portion of the work at such times as necessary and/or directed so as to insure meeting scheduled completion dates and to avoid delaying their operations or the operations of any other contractor. The Architect and the Prime Contractor shall establish completion dates, schedule the times of work in the various areas involved, etc. Each Contractor shall cooperate in establishing and maintaining these times and locations and shall process his work so as to insure the proper execution of same. Each Contractor shall pay for any injury or damage in the work of any other Contractor which may be done by him or his workmen. The Contracting Officer shall be the arbitrator of any disputes in such manners as may arise and his decision will be final.

1.4 WORK NOT INCLUDED:

- A. Where work described clearly by such terms as "future", "furnished by others", "furnished by Owner", "furnished by Electrical Contractor", or "furnished under another section of the Contract" is accompanied by an explicit requirement for rough-in or connection of utilities by this Contractor, such work shall be performed by him and capped if item is not ready for immediate installation. Receiving, placement, furnishing, or adjustment of such items is not included unless specifically noted or specified.
- B. Where work described as above does not include specific requirements for work by this Contractor, then each trade shall inform himself to the nature of the item or work described and how it relates to his portion of the work.

1.5 DEFINITIONS:

- A. **FURNISH:** The term furnish means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation and similar operations.

- B. INSTALL: The term install describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.
- C. PROVIDE: The term provides means to furnish and install, complete and ready for intended use.

1.6 CONTRACT DRAWINGS, SPECIFICATIONS AND RELATED DATA:

- A. The intent of the drawings and specifications is that the Prime Contractor provide labor and materials, equipment and transportation necessary for the proper execution of the entire work unless specifically noted otherwise. Prime Contractor shall do the work shown on the drawings and described in the specifications, and incidental work necessary to complete the project in a substantial and acceptable manner, ready for use, occupancy and operation by the Owner.
- B. The drawings are essentially diagrammatic, and although size and location of equipment are shown to scale wherever practicable, make use of all the data in the total contract documents, and the various manufacturer's literature, verify data at building site, and make the parts of each installation compatible.
- C. The drawings indicate required size and points of termination of pipes, conduits, and ducts, and suggest proper routes to conform to structure, avoid obstructions, and preserve clearances. It is not intended that the drawings indicate specific routing and necessary offsets, and the Prime Contractor shall make the installation in a workmanlike manner to conform to the structure, to avoid obstructions, to preserve head room, and to keep openings and passageways clear without additional instruction, and without additional cost to Owner.
- D. These specifications include incomplete sentences. Omitted words or phrases shall be supplied by inference. The intentional omission of words or phrases includes, but is not limited to, "any", "all", "a", "the", "an", "as shown", "as specified", "the Contractor shall".
- E. Manufacturer's directions - each piece of equipment shall be installed in strict accordance with the manufacturer's published directions. Obtain these directions and make the installation accordingly. Discrepancy between manufacturer's directions and the plans and specifications shall be called to the attention of the Architect in writing before the installation is made.
- F. Conflict - in the event of conflict in the contract documents, the document requiring the better quality or greater quantity shall govern. Comply with drawings as to location, arrangement, shape and details of construction. Comply with technical specifications as to equipment, materials, workmanship, performance, and installation procedures. Equipment called for on the plans and not listed in the specifications shall be provided and installed as though it were fully described herein. Equipment called for in the specifications shall be completely provided and installed, whether fully detailed or not on the plans, and/or schedules.
- G. Discrepancies in drawings - discrepancies found between the drawings and specifications and site conditions, or errors or omissions in the drawings or specifications shall be immediately reported to the Architect who will promptly correct such error or omission in writing. Work done by the contractor after his discovery of such discrepancies, errors or omissions shall be done at the Contractor's own risk.
- H. Additional instructions - further instructions may be issued during the progress of the

work by means of drawings, or otherwise, to make clearer or more specific the drawings and specifications, or as may be necessary to explain or illustrate changes in the work to be done.

- I. Drawings and specifications at job site - one complete set of drawings and specifications shall be maintained at the job site and shall be available to the Architect upon request.
- J. Dimensions - figured dimensions on the plans shall be used in preference to scaling the drawings. Where the work of any Contractor is affected by finish dimensions, these shall be determined by the Contractor at the site, and he shall assume the responsibility therefore.

1.7 CODES, REGULATIONS, AND STANDARDS

- A. All work must be performed in accordance with the requirements of U.S. national codes and regulations including the requirements of the following:
 - 1. International Building code (Latest Edition)
 - 2. International Mechanical code (Latest Edition)
 - 3. International Plumbing Code (Latest Edition).
 - 4. International Fuel Gas Code (Latest Edition).
 - 5. National Electrical Code.
 - 6. Life Safety Code, N.F.P.A. No. 101.
 - 7. Occupational Safety and Health Act. of 1970
 - 8. For work not specifically listed above, use standards and codes of the National Fire Protection Association (NFPA).
 - 9. U.F.C. 3-400-02N
- B. All equipment, apparatus and systems shall be rated, tested, fabricated and/or installed in accordance with the applicable industry standard mentioned. The following list will serve to clarify abbreviations that appear in other sections of this specification:

1.8 ABBREVIATIONS:

- A. In addition to the codes, ordinances, rules, regulations, orders and other legal requirements with which compliance is required by Section 011100, Par. 1.30 or by governing authorities, industry standards published by the following organizations shall apply as applicable:
 - 1. AABC Associated Air Balance Council
 - 2. ADC Air Diffusion Council
 - 3. AFI Air Filter Institute
 - 4. AISC American Institute of Steel Construction
 - 5. AMCA Air Movement and Control Association
 - 6. ANSI American National Standards Institute
 - 7. API American Petroleum Institute
 - 8. ARI Air Conditioning and Refrigeration Institute
 - 9. ASA Acoustical Society of America
 - 10. ASHRAE American Society of Heating, Refrigeration & Air-Conditioning Engineers
 - 11. ASME American Society of Mechanical Engineers
 - 12. ASPE American Society of Plumbing Engineers
 - 13. ASTM American Society for Testing Materials
 - 14. AWS American Welding Society

15. AWWA..... American Water Works Association
16. CISPI Cast Iron Soil Pipe Institute
17. EPA..... Environmental Protection Agency
18. FS Federal Specifications
19. IBR..... Institute of Boiler and Radiator Manufacturers
20. IEEE..... Institute of Electrical and Electronic Engineers
21. MSS Manufacturers Standardization Society of the Valve & Fittings Industry
22. NBS National Bureau of Standards
23. NEBB..... National Environmental Balancing Bureau
24. NEC National Electrical Code
25. NEMA National Electrical Manufacturers
26. NFPA National Fire Protection Association
27. NSF..... National Sanitation Foundation
28. OSHA..... Occupational Safety and Health Administration
29. SBI Steel Boiler Institute
30. SMACNA Sheet Metal and Air Conditioning Contractors National Association
31. UL Underwriters Laboratories

1.9 SUBSTITUTION OF EQUIPMENT

A. The contractor may offer to substitute equipment of manufacturers other than those listed in the various specification sections for approval of the Contracting Officer. The request for substitution of equipment shall be submitted by the Contractor to the Contracting Officer within fifteen (15) calendar days after award of the contract. It is incumbent on the Contractor to submit technical data that will fully establish the equality of the proposed substitute equipment with that listed and evidence to substantiate the availability of the required repair and maintenance service. Each request for substitution shall be accompanied by the following information for each piece of equipment:

1. Statement indicating that this substituted equipment is compatible with related system components and will not increase the contract cost directly or indirectly nor extend the completion date.
2. Manufacturer's name and model number.
3. Catalog cuts, diagrams and other data published by the manufacturer with the particular model identified and the pertinent design data for that model highlighted or underlined for easy reference.
4. Parts lists and recommended spare parts required for preventive maintenance and minor field repairs.
5. Each request for substitution shall also include the following information relating to service maintenance and repair:
 - a. Name, address and telephone number of nearest factory authorized technical representative.
 - b. Name, address and telephone number of firm(s) qualified to perform preventive maintenance, minor or major repairs in the locale of the project.
 - c. Name, address and telephone number of firm(s) from whom spare parts and major components are available.
 - d. Building name and address, and the name, address and telephone number of its Contracting Officer where equipment of the same manufacturer as that requested for substitution has been installed and in operation for two or more years. Two or more such installations shall be listed and the location should be in the vicinity of the proposed project.

- e. All literature and data submitted shall be published in the English language.
6. In the event of Contracting Officer's approval of a substitution of equipment, the Contractor will be notified by telephonic message by the Contracting Officer (or authorized representative), followed by the issuance of an amendment to the contract incorporating the equipment by name and model number.

1.10 SHOP DRAWINGS AND SUBMITTAL DATA:

- A. All product and equipment data shall be submitted to the Architect for review within 30 calendar days of the award of a contract. Submittals shall be accompanied by a transmittal letter containing the project name, date, contractor's name, number of copies of drawings or data and specification section to which applicable. Submittals for inter-related items are to be submitted simultaneously. Submittals for substitutions which do not bear the signature of approval of the Contracting Officer will be returned without review. Architect shall be allowed 14 calendar days from date of receipt for review.
- B. Provide shop drawings and submittal data for all systems, materials and equipment proposed for use on this project. Shop drawings for floor plans, sections, and elevations shall be carefully drawn to scale. Out-of-scale drawings showing actual dimensions will not be acceptable. All shop drawings and submittals shall be submitted in English language and English measurement. Refer to specification Section 013300 for submittal formats.
- C. These specifications and the accompanying drawings are intended to describe and illustrate systems which will not interfere with the building structure and which will fit into the available spaces. Prepare an installation drawing for any critical area, illustrating the installation of the work in this Division as related to the work of all other Divisions, and correct interferences with the other trades or with the building structure before the work proceeds.
- D. The Mechanical Contractor shall, in addition, submit shop drawings and/or diagrams for approval and for job coordination, where required, because of job conditions, interferences or substitutions of equipment, or when requested by the Architect for purposes of clarification of the Contractor's intent.
- E. The Architect's approval of such drawings shall not relieve the Contractor of responsibility for deviation from the Contract Drawings or Specifications, unless he has in writing called the Architect's attention to such deviations at the time of submission, nor shall it relieve him from responsibility for errors or omissions in such drawings.
- F. Reference catalog cuts and brochures of products to proper paragraph in specifications. Furnish numerical index by specification paragraph number listing product name, catalog number and reference to page number of submittal brochure. Cross reference individual catalog numbers of substitute products to numbers of specified materials. Bind submittal in booklet form.
- G. Shop drawings shall include, but shall not be limited to:
 1. Duct layouts.
 2. Piping layouts.
 3. Temperature controls and electrical interlocks.
- H. Submittal data (manufacturers' catalog data) shall include, but not be limited to:

1. Pipe, fittings, valves and accessories.
2. Mechanical insulation.
3. Plumbing devices, including hydrants, shock absorbers, traps, and drains.
4. Plumbing fixtures and trim.
5. Fans with fan curves.
6. Air distribution devices.

1.11 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage and handling.
- B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.
- C. Coordinate deliveries of mechanical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

1.12 PROTECTION OF EQUIPMENT AND SYSTEMS

- A. Contractor shall keep all his respective pipe openings closed by means of plugs or caps to prevent entrance of foreign matter during construction and cover all fixtures, equipment, and apparatus as required to protect them against dirt, water, chemical or mechanical damage both before and after installation. Any such fixtures, equipment or apparatus damaged prior to final acceptance of the Work shall be restored to its original condition or replaced by Contractor at no cost to Contracting Officer.

1.13 MAINTENANCE MANUAL AND OPERATING INSTRUCTIONS

- A. Upon completion of the Work, Contractors shall provide the Contracting Officer with three copies of maintenance manual for all equipment furnished and installed under his Work. Manuals shall be in substantial 3-ring binders with project name and number inscribed on face and hinged back. Manual shall include roster of all AAFES and Installation training session attendees. The manual shall, however, first be approved by the Contracting Officer.
- B. The manual shall include manufacturer's lubricating and operating instructions and parts list and serial numbers for all operating machinery, including drive information, and motor horsepower, amperage, and voltage readings on all phases, valve chart, sequence of operation, index following the order listed in the specifications, warranties in the name of the Installation, and a list of manufacturers, service firms and subcontractors names and telephone numbers.
- C. Training attendance rosters for each training session shall be included in manuals. Roster will identify training subject, date, attendees name, job title, office symbol, grade/rank, and telephone number.

1.14 PROJECT RECORD AND CLOSEOUT DOCUMENTS

- A. Refer to the Architectural specifications for requirements. The following paragraphs supplement the requirements of Division 01.

- B. Mark Drawings to indicate revisions to piping and ductwork, size and location both exterior and interior; including locations of coils, dampers and other control devices, filters, boxes, and similar units requiring periodic maintenance or repair; actual equipment locations, dimensioned for column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned to column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.
- C. Mark Specifications to indicate addenda, approved substitutions, change orders, actual equipment and materials used.

1.15 WARRANTY:

- A. Each Contractor shall guarantee all labor and material furnished by him for a period of one-year from the date of acceptance of the completed work. Certain work shall be guaranteed for a longer period when so specified. The guarantee shall cover the repair or replacement without additional cost to the Owner of any and all defects, which, in the opinion of the Architect, are as a result of defective materials or faulty workmanship.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 23 00 03**START-UP, CLEANING, TESTING AND ADJUSTMENT****PART 1 - GENERAL****1.1 RELATED REQUIREMENTS:**

- A. The Conditions of the Contract, including the General Conditions and Supplementary Conditions, and Division 01 - General Requirements, apply to work covered by this Section.
- B. Comply with Division 23 Sections, as applicable. Refer to other Divisions for coordination of work.
- C. Sections 230001 and 230009 shall apply to this section.
- D. Balancing shall be accomplished in accordance with Section 230072.

1.2 WORK INCLUDED:

- A. Adjust, check, repair and place in service the various mechanical systems specified in Division 23 and shown on the Drawings with their respective equipment, accessories and piping. Furnish all labor, materials and tools necessary to conduct the tests herein specified and those required by the governing authorities.
- B. No work of any nature shall be covered, enclosed or otherwise concealed until properly inspected, tested and approved. Any leaks which develop during any of the tests shall be corrected with new material and made as good as required; said tests shall be repeated until the work is satisfactory to the Architect in every way.
- C. Each separate system with its various components shall be operated by the Contractor for a reasonable length of time to demonstrate the performance of all equipment and piping in accordance with the true intent and purpose of the plans and specifications. All necessary adjustments shall be made to the satisfaction of the Architect.

1.3 OPERATION PRIOR TO ACCEPTANCE:

- A. When any equipment is operable, and it is to the advantage of the Contractor to operate the equipment, he may do so provided that he properly supervises the operation, and retains full responsibility for the equipment operated. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, install clean filter media, make all required adjustments, and complete all punch list items before final acceptance by the Owner.
- B. The Owner may require operation of parts or all of the installation for beneficial occupancy prior to final completion and acceptance of the building. This operation shall not be construed to mean acceptance of the work. The owner will furnish supervisory personnel to direct operation of the equipment. The contractor shall assume responsibility until final acceptance.
- C. The date of acceptance by the Architect for beneficial use by the Owner shall be the beginning date of the warranty period for equipment and workmanship.

1.4 PRELIMINARY OCCUPANCY:

- A. The Owner retains the right at all times to deliver, place, and install furnishing, etc., as the work progresses as long as there is no interference with the Contractor. Such preliminary occupancy shall not be construed as acceptance of such occupied portion of the building.

1.5 CLEANING UP:

- A. Each Contractor shall at all times keep the premises free from accumulations of waste materials or rubbish caused by his employees or work, and at the completion of the work shall remove all his rubbish from and about the building and all his tools, scaffolding and surplus materials and shall leave the work "broom clean" or its equivalent unless more exactly specified.

1.6 START-UP OF EQUIPMENT AND SYSTEMS:

- A. Whenever the manufacturer of a particular item of equipment or a particular system makes available a start-up service after completion of the installation, such manufacturer's start-up service (rendered by the manufacturer or his authorized representative) shall be provided.
- B. Witnessing and explanations of start-up services shall be included as part of the "Instruction of Owner's Personnel".

1.7 INSTRUCTION OF OWNER'S PERSONNEL:

- A. Provide the services of competent engineers or technicians acceptable to the Architect to instruct representatives of the Owner in complete and detailed operation and maintenance of each item of equipment, and each system. These instructions shall be provided for whatever periods may be necessary to accomplish the desired results. Upon completion of these instructions, the Contractor shall obtain a letter of release, acknowledged by the Owner or his authorized representative, stating the dates on which the various kinds of instructions were given, and the personnel to whom the instructions were given.
- B. Prior to giving the instructions above operate mechanical and electrical systems for a period of sufficient length to demonstrate fulfillment of the contract requirements. During this time, adjustments shall be made to the equipment until the entire system is in satisfactory operating condition, and acceptable to the Engineer.
- C. The Contractor shall be fully responsible for proper maintenance of equipment and systems until the instructions have been given to the Owner's personnel and the letter of release acknowledged.
- D. In providing the instructions to the Owner's personnel, the written operating and maintenance manuals shall be followed in all instances, and the Owner's personnel shall be familiarized with such manuals. Operating and maintenance manuals used for instructions shall include piping diagrams, valve identification charts, control and interlocking wiring diagrams, manufacturers' operation and maintenance manuals, parts lists (with sources identified), and other data as appropriate for each system, and as required elsewhere in the Specifications to be furnished to the Owner prior to final acceptance of the project.

PART 2 - PRODUCTS

2.1 STERILIZATION:

- A. After completion of the testing, the entire cold and hot water piping systems with attached equipment shall be thoroughly sterilized with a solution containing not less than 50 parts per million of available chlorine. The chlorinating material shall be either liquid chlorine, or chlorinated lime conforming to the requirements of Federal Specification O-C-114, and shall be pumped into the system thru the connection described below. The sterilizing solution shall be allowed to remain in the system for a period of 8 hours, during which time all valves and faucets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clear water until the residual chlorine content is not greater than 0.2 part per million.
- B. The sterilizing solution shall be introduced into the water system through 3/4 inch opening to be provided in the water main on the house side of the water meter.

PART 3 - EXECUTION

3.1 CLEANING:

- A. Thoroughly clean items of equipment, fixtures, and systems, and leave them free of dust, dirt, and marks, and remove labels that may be applied to item surfaces. Clean baskets and strainers of floor drains and of floor sinks. Completely clean condenser surfaces to remove debris, rubbish and foreign materials.
- B. Flush all piping for new domestic water lines with fresh water, opening and closing all flush valves and faucets until water runs clear at all outlets. Sterilize lines as required under Part 2.
- C. During installation of new waste and drain lines, swab out lines in sections as they are being installed, flush with fresh water.
- D. After new duct systems have been completed, clean systems by operating fans for 48 hours with temporary filters in service; then remove the temporary filters, install the "permanent" filters, and place the systems in service.
- E. Repetition: Repeat the above procedures until all parts of each piping system is thoroughly cleaned of all foreign materials.

3.2 TESTING:

- A. General:
 - 1. Notify Contracting Officer three days prior to tests, who will notify other interested parties. Submit three (3) copies of all testing reports to Contracting Officer.
 - 2. Test all pipes before they are backfilled, concealed in furrings or chases, insulated, painted, or otherwise covered up or rendered inaccessible. Isolate pressure sensitive equipment items before applying test pressures.
 - 3. Test systems in portions as required by the construction schedule and the portion being tested shall be effectively isolated and sealed off. When a previously tested section is connected to another section, the test shall be rerun to include the new connection.
 - 4. If pressure losses occur in a system, use suitable procedures to discover the leaks, correct as required, and retest. Repeat until the system is tight.
 - 5. Furnish all compressed air pumps; tanks of compressed air and/or nitrogen; water pumps; and gauges, plugs, seals, etc., as required to obtain and measure the pressures during tests.

6. Should the completion of the following tests leave any reasonable question or doubt relative to the integrity of any portion of any installation, institute such additional tests or measures as may be required to demonstrate the integrity of these systems to the complete satisfaction of the Architect. Conduct and complete tests before any joints in piping are concealed or made inaccessible.
- B. System Tests:
1. New grease and sanitary waste and vent systems: Grease and sanitary waste and vent piping systems shall be tested in vertical segments approximately 50 feet in height. After the vertical lines of soil pipe, wastes, and other parts of the sanitary system have been installed, "plug-up" all outlets temporarily. Fill pipes with water to the top of their systems and allow them to remain filled for 24 hours. If after 24 hours the level of water has been lowered by leakage, locate the leaks and repair them in a manner approved by the Architect. Then raise the water level again to the top of the system and repeat the test until after a 24 hour retention period there is no perceptible lowering of the water level in the system being tested. Tests may be done in sections to accommodate the construction progress if so desired.
 2. Potable Water Systems: Test new and revised water piping systems and prove them tight to 75 psig greater than the anticipated working pressure (but not less than 150 psig) for a period of eight (8) hours prior to the application of any insulation. Any leaks detected shall be corrected and test repeated until an eight (8) hour period has passed with no leaks observed. After each system has been proved tight, water flow shall be proved at each item of equipment in the system.
 3. Ductwork shall be tested and balanced per SMACNA recommendations.
 - a. Maximum allowable leakage in low pressure systems is 5%.
 - b. Medium and high pressure systems shall be tested to maximum rated pressure or fan pressure (whichever is higher) in a no-flow condition. Any leaks or noise shall be satisfactorily eliminated.
 - c. Ductwork with sealed joints shall be pressure tested and proven leak free at the maximum pressure the system will develop at no flow conditions.
 4. Copper Piping: Test each copper piping system with an ohmmeter to ascertain that there is essentially no electrical continuity between a copper system and ferrous piping, materials or equipment.

3.3 REPAIRS:

- A. Leaks in screwed joints shall be repaired by tightening the joint, or by remaking the joint if tightening fails to stop the leak. Leaks in welded joints shall be repaired by chipping out the weld around the leak and re-welding. Leaks in caulked joints may be stopped by additional caulking of the joint, but if that fails, the joint shall be remade. A leak in a compression joint shall be repaired by remaking the joint using a new seal, compression ring, coupling, etc., as required. Leaks in solder or brazed joints shall be repaired by remaking the joint and no soldering or brazing over existing joints will be permitted. Leaks at mechanical couplings shall be repaired by tightening; but if that fails, remake the joint, refinishing surfaces or replacing sections of piping, installing new rings, couplings, etc., as required. Leaks in fused joints may be repaired by additional fusing and clamping, but if that fails replace materials and make new joints. Leaks in other plastic lines shall cause replacement of materials and joints. Any defective piping shall be replaced.

3.4 TESTING AND BALANCING:

A. General:

1. Testing, adjusting and balancing (TAB) of the air conditioning system and related ancillary equipment will be performed as required by conditions of Section 230072. Refer to Section 230072 for specific work to be accomplished by the TAB Contractor. Refer to below and Part 3 of this section for specific work to be accomplished by this Contractor.
2. As a part of this project, the mechanical contractor shall make any changes in the sheaves, belts, and dampers required for correct balance as required by Section 230072, at no additional cost to the Owner.
3. Project contract phasing and completion schedules shall provide sufficient time to permit the completion of TAB services and remedial work as required prior to Owner occupancy.
4. The plans and specifications have indicated valves, dampers, and miscellaneous adjustment devices for the purpose of adjustment to obtain optimum operating conditions, and it will be the responsibility of the Contractor to install these devices in a manner that will leave them accessible and readily adjustable. Should any such device not be readily accessible, the contractor shall provide access as required for work under Section 230072. Also, any malfunction encountered by TAB personnel and reported to the Contractor or the Company Representative shall be corrected by the mechanical contractor immediately so the balancing work can proceed.

B. Preparation For Testing, Adjusting, And Balancing:

1. Refer to Section 230072 for specific requirements for the work required for hydronic, airside, and controls balancing. Have all systems completed and in an operational readiness prior to notifying the TAB Contractor that the project is ready for his services.
2. Completion and operational readiness, prior to beginning of Division 230072 "TAB" services, shall include:
 - a. Verification that building construction status includes installation of all ceilings included in construction Contract, and permits the closing of all doors and windows to permit the obtaining of projected operating conditions.
 - b. Air Distribution Systems:
 - 1) Inspect installation and verify conformity to design. Verify that supply, return and exhaust ducts have been pressure-tested for leakage as recommended in the specifications.
 - 2) Verify that volume dampers are properly located and functional.
 - 3) Verify that supply, return, exhaust and transfer grilles, registers, and diffusers are installed and operating properly.
 - 4) Verify that supply and exhaust fans are operating and are free from vibration, with proper fan rotation and belt tension; that heater elements in motor starters are of proper size and rating; provide records of amperage and voltage readings at each motor, and verification that they do not exceed nameplate ratings.
 - 5) Verify that specified and scheduled electrical interlocking of equipment items has been performed and is operational.
 - 6) Check vibration isolation equipment for Specification compliance and for correct adjustment.

3.5 NOTIFICATION OF SYSTEM READINESS:

- A. After completion of the work described above, the Contractor shall notify the Contracting Officer in writing, certifying that the work has been accomplished and that the building and the air conditioning systems are in readiness for testing, adjusting, and balancing. He shall include a copy of the tabulated data.
- B. Upon approval by Contracting Officer, but not longer than five (5) working days from Owner's receipt of Contractor's certification, the Contractor shall notify the TAB Contractor of the readiness for balancing and include copies of the Contractor's certifications and the tabulated voltages and currents.
- C. Should the systems be found to NOT be in readiness, the Contractor shall request an inspection be made by a duly appointed representative of the Owner, and TAB Contractor and this Contractor. This inspection shall establish to the satisfaction of the representative parties whether or not the systems meet the basic requirements for TAB services.

END OF SECTION

SECTION 23 00 06

OWNER FURNISHED EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Furnish all labor, materials, services, equipment and appliances required in conjunction with the receiving, unloading, handling, final placement and installation of equipment and systems furnished by Owner as indicated on the drawings and as described herein.

PART 2 - PRODUCTS

2.1 OWNER FURNISHED EQUIPMENT:

- A. The Owner will furnished the following equipment for installation by Contractor:
 - 1. Food service equipment and appliances as so noted and scheduled on the Architectural and MEP drawings.
 - 2. Food Service Exhaust Hoods as so noted and scheduled on the Architectural and MEP drawings.

END OF SECTION

SECTION 23 00 09**BASIC MATERIALS AND METHODS****PART 1 - GENERAL****1.1 RELATED REQUIREMENTS:**

- A. The Conditions of the Contract, including the General Conditions and Supplementary Conditions, and Division 01 - General Requirements, apply to work covered by this Section.
- B. Comply with Division 23 Sections, as applicable. Refer to other Divisions for coordination of work.
- C. The requirements set forth in this Section of the Specifications apply equally to all Sections within Division 23, except where superseded by more restrictive requirements.

1.2 STANDARD PRODUCTS:

- A. Each item of equipment furnished under this Division of the Specifications shall be essentially the standard product of the manufacturer. Where two or more units of the same kind or class of equipment are required, these shall be the products of a single manufacturer; however, the component parts of the equipment need not be the products of one manufacturer.
- B. Materials and equipment shall be new and of the best quality normally used in good commercial practice. Each major component shall bear a nameplate giving the name and address of the manufacturer, and the catalog number or designation of the component.

1.3 QUALITY AND CLASSIFICATION OF MATERIALS:

- A. Materials and equipment shall be new and of the quality specified, and shall be free from defects at the time of installation. Materials or equipment damaged in shipment or otherwise damaged prior to installation shall not be repaired at the job site, but shall be replaced with new materials or equipment identical with those damaged.
- B. Wherever a UL standard has been established for a particular type of material or equipment, each such material or equipment provided on this project shall meet the requirements of the UL standard in every way and shall be UL listed and labeled.

1.4 LOCAL PARTS AND SERVICE:

- A. Each item of equipment furnished on this project shall have local representation, for factory-authorized service, with an adequate stock of repair parts. "Local" shall be defined, for this purpose, as "within 150 miles of the project site".

1.5 SPACE AND EQUIPMENT:

- A. The size of each item of mechanical equipment shown on the Drawings is based on the dimensions of a particular manufacturer. While other manufacturers may be acceptable, it shall be the responsibility of the Contractor to determine whether or not the equipment he proposes to furnish will fit into the space. Shop drawings shall be prepared when required by the Architect to indicate a suitable arrangement.

- B. Install equipment in a manner to permit access to all surfaces. Install valves, motors, drives, lubricating devices, filters, and other accessory items in a position to allow removal for service without requiring the disassembly of another part.
- C. Large equipment assemblies or components which will be installed in the building, and which are too large to permit access through doorways, stairways or shafts, shall be brought to the site and placed in the appropriate spaces before the enclosing structure is completed. The equipment shall be protected until all hazards of damage to the equipment are eliminated.

1.6 PRODUCT HANDLING:

- A. Keep materials dry and protected against weather and humidity. At all times take every precaution to properly protect apparatus from damage. Include erecting temporary shelters to protect apparatus stored at the site, cribbing of apparatus in the uncompleted building with ventilated plastic sheeting or other protective coating. Failure on the part of the Contractor to comply with the above to the satisfaction of the Architect will be sufficient cause for the rejection of the pieces of apparatus in question.
- B. Responsibility for the protection of apparatus shall extend to presently installed apparatus. Erect temporary sheltering structures, provide temporary bracing and supports, or cover equipment as required or directed to afford proper protection.

1.7 SALVAGED MATERIALS:

- A. Reuse no salvaged materials except as noted on the Drawings, specified herein, or directed by the Architect. Remove from the premises all present materials falling under this Division which are removed from the existing building.

1.8 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS:

- A. Materials and adhesives used throughout the mechanical and electrical systems for insulation, acoustical lining, filters, ducts, flexible connections, and jackets or coverings regardless of kind, or for piping or conduit system components, shall have a flame-spread rating of not over 25 without evidence of continued combustion and with a smoke developed rating not higher than 50. If such materials are to be applied with adhesives, they shall be tested as applied with such adhesives, or the adhesives used shall have a flame-spread rating not over 25 and a smoke developed rating not higher than 50.
- B. "Flame-spread rating" and "smoke developed rating" shall be as determined by the "method of test of surface burning characteristics of building materials, NFPA No. 255, ASTM E84, Underwriters' Laboratories, Inc., standard". Such materials are listed in the Underwriters' Laboratories, Inc., "building materials list" under the heading "Hazard Classification (Fire)".

PART 2 - PRODUCTS

2.1 EQUIPMENT FOUNDATIONS, HANGERS AND SUPPORTS:

- A. Where indicated on the Drawings, provide foundations, hangers, and supports for mechanical equipment. These shall include concrete pads, manufactured hanger components, and fabricated supports, constructed in accordance with the details on the Drawings, these Specifications, and the manufacturer's recommendations. Provide shop drawings of items to the Architect for approval prior to construction.

- B. Provide appropriate mounting supports within the building elements as required for installation of plumbing fixtures, access panels, and other devices which install recessed into walls, floors and ceilings.

2.2 PIPE SLEEVES:

- A. Provide a pipe passing through an interior concrete beam or wall with a standard weight galvanized steel pipe sleeve. Make the i.d. of the sleeve at least 1/2" greater than the o.d. of either the insulation on covered line or of any bare pipe.

2.3 ACCESS PANELS:

- A. Furnish an access panel for each location where mechanical equipment such as a manual valve, trap primer, manual damper, fire damper, etc. is installed behind a furring, chase, or non-removable suspended ceiling except such panels as are furnished on the Architectural drawings. These panels will be installed in the walls or ceilings by the trade involved under the applicable Division of the general specifications. So size and position each access panel that the concealed equipment can be properly serviced, with the exact location subject to Architectural approval.
- B. Access panels shall be Milcor, Karp or equivalent steel access panels with hinged doors with latching devices. In fire rated location UL 1-1.2 hr. B labeled door.
- C. Installation of access panels and doors shall comply with the requirements of Architectural Specifications.

2.4 FLOOR, CEILING AND WALL PLATES:

- A. Provide concealed hinge chrome-plated sectional escutcheons on pipes and hanger rods penetrating walls, floors and ceilings in finished areas of the building.
- B. Provide galvanized or aluminum collars and flanges on ducts passing through floors, walls and ceilings in finished areas of the building.
- C. Size escutcheons and collars to fit snugly around pipes, rods, and ducts, and where these items are insulated, size the escutcheons and collars to fit snugly over the insulation and cover completely the openings through which the pipes, rods or ducts pass.
- D. Hold escutcheons and collars firmly in place with set screws or clamps. Provide spring catches.
- E. All exposed pipes, conduits, ducts, etc., exposed in rooms passing through floors, shelves, cabinets, ceilings, and walls shall be provided with floor and ceiling plates of approved finish and pattern.

2.5 SAFETY GUARDS:

- A. Provide and install a belt guard covering the entire drive assembly for each belt driven equipment item provided under this contract. Use factory assembled belt guards when they are available. Where a guard must be fabricated, rigidly construct it with a sheet metal rim and a side panel of sheet metal of 1/2 inch metal hardware cloth, with openings for tachometer insertion. Size each guard to permit full travel of the motor slide rails for belt tightening and install each guard so as to permit removal for servicing the drive.

- B. Guards shall also be installed to protect all projecting shafts and all rotating shafts, coupling, keyways, etc. Generally these shall be formed of not lighter than 18 gauge galvanized steel, bent to the proper shape and secured in place using removable fastening devices.
- C. Provide safety guards over all moving equipment - belt guards for V-belt drives and hoods over rotating shafts, coupling, keyways, etc. They shall be secured in place using removable fastening devices. They shall meet the requirements of the general safety codes in effect at the project location.

2.6 SEALING OF PENETRATIONS:

- A. See Architectural Specification for fire stopping materials and scope.
- B. See Architectural Specification for sealing wet or potentially wet penetrations through walls or floor other than those requiring fire stopping.

2.7 SPECIAL TOOLS:

- A. Furnish a set of special tools and devices required for the proper maintenance of the major pieces of equipment and install on adequate tool board. This shall include only tools which cannot normally be purchased "over the counter" at hardware stores.

2.8 BEARINGS:

- A. Ball bearings shall be of the radial or thrust type, or of the type designed to resist both radial and thrust loads, enclosed in dustproof and moisture-proof housings. Bearings shall be designed for 200,000 hour average life, selected in accordance with AFBM rating B10, and arranged for lubrication through Alemite fittings. Grease fittings shall be brought to the outside of equipment and other enclosures, to accessible locations.

2.9 FLASHINGS:

- A. Plumbing: Provide flashings where vent pipes penetrate roof. Flashing shall consist of sheet lead, 4 lb/ft², conforming to Federal Specifications QQ-L-201, Grade B. Base shall extend not less than 10" beyond exterior surface of pipe and turn down inside pipe not less than 1-inch.
- B. Other roof flashings shall be constructed from 20 gauge galvanized steel sheets, with base extending not less than 10 inches beyond exterior surface of the opening to be flashed.
- C. Installation:
 - 1. Coat backside of lead flashings where in contact with concrete and other cementitious substrates, by painting surface in area of contact with heavy application of bituminous coating, or by other permanent preparation as recommended by manufacturer of metal.
 - 2. Bituminous coating shall conform to Fed. Spec. TT-C-494, cold applied solvent type mastic for application in dry film thickness of 15 mils per coat.

PART 3 - EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

- A. The Drawings and Specifications are intended to accomplish certain objectives. These documents show pipe and duct sizes, general routing and location, and describe the various systems. They describe and size equipment, its general location, usage, support and auxiliary requirements. They describe most, but not all of the materials and their usage for this project.
- B. Contract Documents do not, however, detail certain job requirements. They do not show exact layouts, locations or elevations of ducts, expansion joints, anchors, sleeves, hangers, slots, holes, outlets, inserts, elbows, fittings, thermometers, thermostats, gauges, wells, under floor drains, sumps, or access doors. They do not show final precise locations of equipment by dimensions in most instances.
- C. The exact location of each item shall be determined by reference to the project Contract Drawings, and to details, equipment drawings and roughing-in drawings, by measurements at the building, and in cooperation with the various trades. Minor relocations necessitated by the conditions at the site or directed by the Owner shall be made without additional cost to the Owner.
- D. Coordinate proper locations and sizes of slots, holes or openings in the building structure pertaining to this work, and for the correct location of sleeves. Place inserts to accommodate the ultimate installation of hangers in the forms, and set sleeves in forms under construction. Concealed lines shall be installed as required by the pace of the job to proceed the general construction.
- E. The routing of piping, ductwork, conduits, etc., indicated on the drawings is approximate and where light fixtures or other items of work are to be recessed in ceiling, piping, ductwork, conduits, etc., shall be routed around the light fixtures or other items of work where there is not sufficient space for same to be routed above such item of work with the recessed item properly installed. Any required changes due to the Contractor's failure to properly coordinate his work with recessed items shall be made by the Contractor installing such piping, ductwork, conduits, etc.
- F. All piping, ductwork, conduits and all other items of work supported from the structure above shall be installed as high as physically possible (not just as convenient) considering all work required to be installed in the available space. If any such work is installed lower than it could have been installed, the Contractor shall furnish all labor, equipment and materials to remove same and reinstall the work as high as possible.

3.2 LOCATION OF OUTLETS:

- A. Locations of ductwork, pipes, outlets, fixtures, etc., are not to be scaled from Electrical, HVAC or Plumbing drawings. Exact location to be determined from Architectural drawings and/or in conjunction with location of equipment, fixtures, and outlets of all trades. Plans and schematic representations and apparent conflicts must be brought to the attention of the Architect before installation of any material. Work under this section must be coordinated as to location with all work under all sections of these specifications.
- B. Generally, all outlets shall be properly centered in rooms, panels and other finished work and shall not interfere with outlets or equipment of other trades and shall meet the dimensioned or large scale drawings of the Architect.
- C. The Electrical and Mechanical Sub-Contractor shall coordinate their work with the ceiling and wall finish trades, so that the finished project will be symmetrical. Outlets smaller than the pattern, shall be centered on the pattern, while any outlet larger than

pattern shall be centered either on the pattern or at the intersection of four patterns unless dimensioned otherwise on the plans.

3.3 PRECEDENCE:

- A. The mechanical and electrical work shall have precedence over each other in accordance with the following sequence:
1. Lighting fixtures
 2. Air conditioning ceiling grilles
 3. Waste piping.
 4. Ductwork.
 5. Electric wiring.

3.4 PIPING AND DUCTWORK INSTALLATION:

- A. In general, piping and ductwork in finished areas of the building shall be run concealed in chases, walls, furrings, and above suspended ceilings, unless noted or indicated otherwise. Should any condition arise which would cause any piping or ductwork to be exposed in finished areas, it shall be called to the Architect's attention immediately, and correction of the condition shall be made in accordance with the Architect's instructions. Runs of piping shall be grouped wherever it is feasible to do so. Pipes and ducts shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing.
1. In unfinished spaces, such as equipment rooms, piping and ductwork shall be run as high as possible, on a continuous grade, shall be square to the building, and securely supported.
 2. Ducts and pipes run exposed in machinery and equipment rooms shall be installed parallel to the building planes, except that the lines shall be sloped to obtain the proper pitch. Piping and ducts run above furred ceilings shall be similarly installed, except as otherwise shown.
 3. Pipe openings shall be kept closed during construction until the systems are closed with final connections.
- B. Piping and ducts may be run exposed where necessary in mechanical rooms, and where shown in storage spaces. Exposed ducts and piping shall be run in the neatest, most inconspicuous possible manner, and parallel with or perpendicular to the building lines.
- C. Piping and ducts shall be adequately and properly supported from the building structure by means of hanger rods or clamps to walls as herein specified.
- D. Where only limited space is available above the ceilings and below concrete beams or other deep projections, piping or ducts shall be sleeved through the projections, rather than hung below them, in a manner to provide maximum above-floor clearance. Sleeves shall be as herein specified. Approval shall be obtained from the Architect for each penetration.
- E. Miscellaneous Piping Requirements:
1. There shall be no pipe joints nearer than 12 inches to a wall, ceiling or floor penetration unless the pipe joint is of the welded type, or the joint and fitting is required to rise in or flush against the wall.
 2. Study construction documents and lay out work carefully in advance of fabrication and erection, in order to meet the requirements of the extremely

- limited spaces. Where conflicts occur, work with all involved trades and resolve the conflict prior to erection of any work in the area involved.
3. The various piping systems shall be made up straight and true, and shall be run at adequate grades to permit proper flow of the contained material. Piping shall be graded for proper drainage.
 4. Piping shall follow as closely as possible the routes shown on the Drawings, taking into consideration conditions to be met at the site.
 5. Piping shall be installed with due regard to expansion and contraction, and in such a manner as to prevent excessive strain and stress in the piping, in connections, and in equipment to which the piping is connected.
 6. Unions or flanges shall be used at connections to all equipment to facilitate dismantling, and elsewhere as required, in the erection of the pipe or in the installation of valves.
 7. Connection to rotating equipment shall be made in such manner to prevent transmission of vibration into the piping system.
 8. Valves which are required for a control or isolation of any and all parts of the system shall be furnished, installed and located in any accessible position, or made accessible through removal panels, etc., and where several valves are related as to function, they shall be grouped in a battery.

3.5 CUTTING AND PATCHING:

- A. All cutting, drilling, notching and ditching necessary to properly install piping or equipment shall be done by skilled craftsmen of the particular trade and shall be at the expense of the contractor responsible for the piping or equipment, unless specifically indicated otherwise or previously agreed upon by the various Contractors responsible. The Contractor for each section of the work described in these specifications shall cut all openings required to install his work or repair or replace any defective work. All this cutting shall be done under the Architect's direction, and the Contractor shall exercise due diligence to avoid cutting openings larger than required or in the wrong locations. Include channeling walls as required for the installation of wall mounted material and equipment.
- B. In cutting masonry walls, provide and install lintels and/or the structural members to provide adequate protective support for the remaining masonry. Structural members, supports, etc., shall be of the size and shape and installed as directed by the Architect.
- C. Do not cut any structural member in a way to lessen its strength, without specific permission. No cutting or drilling of any sort will be permitted in the webs of pre-stressed, pre-cast concrete structural elements. Use core drills or power driven saws to cut openings in the flanges of such elements; the use of reciprocating drills will not be permitted.
- D. Openings cut in the new building to install materials covered by this Division of the Specifications or to repair or replace defects which may appear up to the expiration of the guarantee, or to repair damage to the work of other trades occasioned by those cutting operations, shall be repaired by the trade whose work is disturbed, but payment thereof shall be by the Contractor cutting the opening or causing the damage.

3.6 PROTECTIVE WRAPPING:

- A. Underground steel piping not specified to have a protective factory coating shall be wrapped with Minnesota Mining and Manufacturing Company's "Scotchrap" No. 51 tape applied with "half-lap" coverage, and installed on clean dry pipe in strict accordance with the manufacturer's directions.

3.7 ROUGH-IN AND FINAL CONNECTIONS:

- A. The Mechanical Sub-Contractor shall have the responsibility of rough-in for and assembly of various equipment and to make final connection to all equipment furnished by Owner or under other sections of these specifications. Installation and assembly of owner-furnished equipment is not a part of the mechanical sub-contract.
- B. Rough-in dimensions for all equipment shall be determined from the manufacturer's Shop Drawings or as directed and in no case shall the location be scaled from the Architectural or Mechanical Drawings.
- C. The Contractor shall be aware that various equipment, valves, strainers, unions, etc., related to his scope and shown on the plans furnished by others shall be coordinated and assembled before installation under this contract.
- D. Refer to equipment specifications in Divisions 02 through 26 for rough-in requirements.

3.8 WELDING:

- A. All welding shall be done by certified craftsmen, experienced in the trade.
- B. Current laboratory welding certification documents shall be provided to Contracting Officer for each welder engaged on this project.
- C. Weldments shall be chipped, cleaned and coated with rust inhibiting paint.

3.9 INTERIOR TRENCHING AND BACKFILLING:

- A. For trenches for lines installed below a floor, to the poured on grade, follow in general the procedures set out for exterior lines except install with a minimum of cover. Backfill with a suitable material and compact to not less than 95% Standard Proctor density immediately prior to the pouring of the floor.
- B. Scoop out trenches in the underhouse areas as required to accommodate all equipment lines, ducts and piping, except waste, drain and sewer lines. Make these trenches adequate in width and depth to keep any such lines or duct a minimum of 6 inches from finished earth grade, and slope the sides of such trenches so that there will be no possibility of the trench walls caving or appreciably sloughing.
- C. Waste drain and sewer lines run in crawl spaces below the floor, may either be suspended from the construction above or supported by the ground in trenches, using procedures set out for exterior lines.

3.10 ELECTRICAL WIRING OF MOTORS AND EQUIPMENT:

- A. Except as otherwise specified in Division 23, field power and power control wiring will be provided under Division 26. Power wiring and disconnect switches for the proper isolation of each piece of equipment shall be provided under Division 26 as necessary for operation in the "hand" position of the hand-off-auto control switch.
- B. Provide complete wiring diagrams showing power, interlock, and control wiring for each item of equipment and each system furnished under Division 23. Diagrams shall be based on the actual equipment furnished, and shall be complete, integral drawings and, not a series of manufacturer's individual diagrams. Submit diagrams to Architect for

review prior to distribution; and, after Architect's approval has been obtained, distribute copies of the wiring diagrams to trades involved to serve as installation drawings.

- C. Control and interlock wiring for the HVAC, plumbing and fire protection systems shall be provided under the Division 26 as necessary for operation in the "auto" position of the hand-off-auto control switch. Wiring shall be in strict accordance with previously submitted and approved wiring diagrams supplied by the mechanical contractor.
- D. At the completion of the project, and before final inspection, those parties having detailed responsibility for (1) temperature control and interlock wiring diagrams, (2) equipment controlled by the temperature control system, and (3) installation of the temperature control and interlock wiring shall meet at the job site and jointly check out. Test and inspect each control circuit, each interlock, and each power circuit to each piece of equipment, and shall advise in writing that each piece of equipment meets their joint approval insofar as performance, operation and interconnect is concerned. This document shall be jointly signed by each responsible individual and included in record documents.

3.11 PAINTING:

- A. Finish painting of all exposed materials and equipment is included as part of the work of another section of specifications. However, the following items shall be as part of the work of this section.
 - 1. All pipes and apparatus shall be thoroughly cleaned and all corrosion, rust and grease removed. No nameplates, rotating shafts, bearing bronzes, electric windings, or valves stems shall be painted nor shall any part furnished in nickel or chrome plated be painted. Clean all copper pipe but do not paint.
 - 2. All motors, pumps, starters, switches and other apparatus furnished from the factory with enamel finish shall have all abraded surfaces touched up with the same type and color of paint.
 - 3. Materials shall be best quality of their several kinds and shall be Sherwin-Williams, Pittsburgh, Pratt and Lambert.

END OF SECTION

SECTION 23 00 18

SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Pipe and equipment hangers and supports.
- B. Sleeves and seals.
- C. Flashing and sealing equipment and pipe stacks.

1.2 RELATED SECTIONS

- A. Section 23 00 01 – General Provisions – Mechanical.
- B. Section 23 00 03 – Startup, Cleaning, Testing and Adjustment.
- C. Section 23 00 09 – Basic Materials and Methods.
- D. Section 23 00 30 - Piping Insulation.
- E. Section 23 00 39 - Plumbing Piping.

1.3 REFERENCES

- A. ASME B31.1 - Power Piping
- B. ASME B31.5 - Refrigeration Piping
- C. ASME B31.9 - Building Services Piping
- D. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
- E. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
- F. MSS SP69 - Pipe Hangers and Supports - Selection and Application.
- G. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

1.4 SUBMITTALS

- A. Submit under provisions of Section 230001 and Architectural Specifications.
- B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.
- C. Product Data: Provide manufacturers catalog data including load capacity.
- D. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.
- E. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for support of plumbing and hydronic piping.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Manufacturers:

1. Fee & Mason.
2. Other acceptable manufacturers offering equivalent products.
 - a. B-Line.

B. Plumbing Piping - DWV:

1. Conform to MSS SP58, MSS SP69 and MSS SP89.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel, adjustable swivel ring.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Plumbing Piping - Water:

1. Conform to MSS SP58, MSS SP69 and MSS SP89.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel, adjustable swivel ring.
3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
9. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
10. Wall Support for Hot Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
11. Vertical Support: Steel riser clamp.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.2 ACCESSORIES

- A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.3 FLASHING

- A. Metal Flashing: 26 gage galvanized steel.
- B. Metal Counterflashing: 22 gage galvanized steel.
- C. Lead Flashing:
 - 1. Waterproofing: 5 lb/sq ft sheet lead.
 - 2. Soundproofing: 1 lb/sq ft sheet lead.
- D. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- E. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

2.4 SLEEVES

- A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage galvanized steel.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage galvanized steel.
- C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
- D. Sleeves for Round Ductwork: Galvanized steel.
- E. Sleeves for Rectangular Ductwork: Galvanized steel or wood.
- F. Firestopping Insulation: Glass fiber type, non-combustible; refer to Architectural Specifications.
- G. Sealant: Acrylic; refer to Architectural Specifications.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Under no circumstances shall piping or ductwork be suspended from floor decking or roof decking.

3.2 PIPE HANGERS AND SUPPORTS

- A. Support horizontal piping as scheduled.
- B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers with 1-1/2 inch minimum vertical adjustment.

- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Provide copper plated hangers and supports for copper piping.
- J. Design hangers for pipe movement without disengagement of supported pipe.
- K. Prime coat exposed steel hangers and supports. Refer to Section 099000. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

3.3 FLASHING

- A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked one inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counterflash, and seal.
- C. Provide curbs for mechanical roof installations 14 inches minimum high above roofing surface. Flash and counterflash with sheet metal; seal watertight. Attach counterflashing mechanical equipment and lap base flashing on roof curbs. Flatten and solder joints.
- D. Adjust storm collars tight to pipe with bolts; calk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

3.4 SLEEVES

- A. Set sleeves in position in formwork. Provide reinforcing around sleeves.
- B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- C. Extend sleeves through floors one inch above finished floor level. Caulk sleeves.
- D. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel escutcheons at finished surfaces.

3.5 SCHEDULES

PIPE SIZE Inches	MAX. HANGER SPACING Feet	HANGER ROD DIAMETER Inches
1/2 to 1-1/4	5	3/8
1-1/2 to 2	10	3/8
2-1/2 to 3	10	1/2
4 to 6	10	5/8
8 to 12	10	3/4
14 and Over	10	1
PVC (All Sizes)	5	3/8
C.I. Bell and Spigot(or No-Hub) and at Joints	5	1/2

END OF SECTION

SECTION 23 00 24

MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe Markers.

1.2 RELATED SECTIONS

- A. Section 23 00 01 – General Provisions – Mechanical.
- B. Section 23 00 03 – Startup, Cleaning, Testing and Adjustment.
- C. Section 23 00 09 – Basic Materials and Methods.

1.3 REFERENCES

- A. A13.1 - Scheme for the Identification of Piping Systems.

1.4 SUBMITTALS

- A. Submit under provisions of Section 230001 and Architectural Specifications.
- B. Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Product Data: Provide manufacturers catalog literature for each product required.
- E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 230001 and Architectural Specifications.
- B. Record actual locations of tagged valves.

PART 2 - PRODUCTS

2.1 NAMEPLATES

- A. Manufacturers:
- B. Seton Nameplate Co.

- C. Other acceptable manufacturers offering equivalent products.
 - 1. W. H. Brady Co.
- D. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color. Letters shall be ¼ inch high.

2.2 TAGS

- A. Manufacturers:
 - 1. Seton Nameplate Co.
 - 2. Other acceptable manufacturers offering equivalent products.
 - a. W.H. Brady Co.
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- C. Chart: Typewritten letter size list in anodized aluminum frame.

2.3 PIPE MARKERS

- A. Manufacturers:
 - 1. Seton Nameplate Co., Model Opti-Code.
 - 2. Other acceptable manufacturers offering equivalent products.
 - a. W. H. Brady Co.
- B. Color: Conform to ASME A13.1.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- D. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service, multiply consisting of solid aluminum core between 2 layers of plastic tape.

2.4 CEILING TACKS

- A. Manufacturers:
 - 1. Seton Nameplate Co.
 - 2. Other acceptable manufacturers offering equivalent products.
 - a. W. H. Brady Co.
- B. Description: Steel with 3/4 inch diameter color coded head.
- C. Color code as follows:
 - 1. Yellow - HVAC equipment
 - 2. Red - Fire dampers/smoke dampers
 - 3. Green - Plumbing valves

PART 3 - EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer. Nameplates installed on outdoor equipment shall be secured with mechanical fasteners.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- F. Identify roof top A.C. units, fans, water heaters and pumps with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
- G. Identify control panels and major control components outside panels with plastic nameplates.
- H. Identify thermostats relating to A.C. units or valves with nameplates.
- I. Identify valves in main and branch piping with tags.
- J. Tag automatic controls, instruments, and relays. Key to control schematic.
- K. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 23 00 30**PIPING INSULATION****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Jackets and accessories.

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Section 230039 - Plumbing Piping: Placement of hangers and hanger inserts.

1.3 RELATED SECTIONS

- A. Section 23 00 01 – General Provisions – Mechanical.
- B. Section 23 00 03 – Startup, Cleaning, Testing and Adjustment.
- C. Section 23 00 09 – Basic Materials and Methods.
- D. Section 23 00 24 - Mechanical Identification.

1.4 REFERENCES

- A. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- B. ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- C. ASTM C195 - Mineral Fiber Thermal Insulation Cement.
- D. ASTM C335 - Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.
- E. ASTM C449 - Mineral Fiber Hydraulic-setting Thermal Insulating and Finishing Cement.
- F. ASTM C518 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- G. ASTM C533 - Calcium Silicate Block and Pipe Thermal Insulation.
- H. ASTM C534 - Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- I. ASTM C547 and J15A9504 - Mineral Fiber Preformed Pipe Insulation.
- J. ASTM C552 - Cellular Glass Block and Pipe Thermal Insulation.
- K. ASTM C578 - Preformed, Block Type Cellular Polystyrene Thermal Insulation.
- L. ASTM C585 - Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).

- M. ASTM C591 - Rigid Preformed Cellular Urethane Thermal Insulation.
- N. ASTM C610 - Expanded Perlite Block and Pipe Thermal Insulation.
- O. ASTM C640 - Corkboard and Cork Pipe Thermal Insulation.
- P. ASTM C921 - Properties of Jacketing Materials for Thermal Insulation.
- Q. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
- R. ASTM D1667 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed Cell Foam).
- S. ASTM D2842 - Water Absorption of Rigid Cellular Plastics.
- T. ASTM E84 - Surface Burning Characteristics of Building Materials.
- U. ASTM E96 - Water Vapor Transmission of Materials.
- V. NFPA 255 - Surface Burning Characteristics of Building Materials.
- W. UL 723 - Surface Burning Characteristics of Building Materials.

1.5 SUBMITTALS

- A. Submit under provisions of Section 230001 and Architectural Specifications.
- B. Product Data: Provide product description, list of materials and thickness for each service, and locations.
- C. Manufacturer's Installation Instructions: Indicate procedures that ensure acceptable workmanship and installation standards will be achieved.

1.6 QUALITY ASSURANCE

- A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84.

1.7 QUALIFICATIONS

- A. Applicator: Company specializing in performing the work of this section with minimum three years experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site.
- B. Deliver materials to site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- C. Store insulation in original wrapping and protect from weather, environment and construction traffic.
- D. Protect insulation against dirt, moisture, water, chemical, and mechanical damage.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 - PRODUCTS**2.1 GLASS FIBER**

- A. Manufacturers:
 - 1. Johns Manville, Micro-Lok.
 - 2. Other acceptable manufacturers offering equivalent products.
 - 3. Owens-Corning.
 - 4. PPG Industries.
 - 5. CSG Corp.
- B. Insulation: ASTM C547; rigid molded, noncombustible.
 - 1. 'K' value: ASTM C335, 0.24 at 75 degrees F.
 - 2. Minimum Service Temperature: -20 degrees F.
 - 3. Maximum Service Temperature: 850 degrees F.
 - 4. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket:
 - 1. ASTM C921, White kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Transmission: ASTM E96; 0.02 perm inches.
 - 3. Secure with self sealing longitudinal laps and butt strips.
 - 4. Secure with outward clinch expanding staples and vapor barrier mastic.
- D. Tie Wire: 18 gage stainless steel with twisted ends on maximum 12 inch centers.
- E. Vapor Barrier Lap Adhesive
 - 1. Manufacturers:
 - a. Childers CHIL-STIX.
 - b. H. B. Fuller – Foster Foam-Seal.
 - 2. Compatible with insulation.
- F. Insulating Cement/Mastic
 - 1. Manufacturers:
 - a. P. K. Insulation – Super Stik.
 - b. Johns Manville.
 - c. Owens-Corning.
 - 2. ASTM C195; hydraulic setting on mineral wool.
- G. Fibrous Glass Fabric
 - 1. Manufacturers:
 - a. Alpha Assoc.

- b. Lewco Spec. Products.
2. Cloth: Untreated; 9 oz/sq yd weight.
3. Blanket: 1.0 lb/cu ft density.

2.2 CLOSED CELL ELASTOMERIC RUBBER

A. Manufacturers:

1. Armstrong Insulation Products

B. Insulation: ASTM C534; AP Armaflex SS Insulation, MIL-Spec: MIL-C-3133B

1. "K" Value: ASTM C177, 0.27 at 75°F.
2. Minimum Service Temperature: -40°F.
3. Maximum Service Temperature: 180°F.
4. Maximum Moisture Absorption: 0.2 Percent by Volume.

C. Sealants:

1. Armstrong 520 Adhesive.

2.3 JACKETS

A. PVC Plastic Fitting Covers:

1. Manufacturers:

- a. Zeston Model 2000.
- b. Proto Model

2. Jacket: ASTM C921, One piece molded type fitting covers and sheet material, off white color.

- a. Minimum Service Temperature: -40 degrees F.
- b. Maximum Service Temperature: 150 degrees F.
- c. Moisture Vapor Transmission: ASTM E96; 0.002 perm inches.
- d. Maximum Flame Spread: ASTM E84; 25.
- e. Maximum Smoke Developed: ASTM E84; 50.
- f. Thickness: 20 mil.
- g. Connections: Brush on welding adhesive or Pressure sensitive color matching vinyl tape.

3. Covering Adhesive Mastic:

a. Manufacturers:

- 1) Celulon Model Ulta-Clear.
- 2) Dow Model 739.

- b. Compatible with insulation.

B. Stainless Steel Jacket: Type 304 stainless steel. (Exterior Use)

1. Thickness: 0.010 inch.
2. Finish: Smooth.
3. Metal Jacket Bands: 3/8 inch wide; 0.010 inch thick stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. On exposed piping, locate insulation and cover seams in least visible locations.
- C. Insulated dual temperature pipes or cold pipes conveying fluids below ambient temperature:
 - 1. Provide vapor barrier jackets, factory applied or field applied.
 - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe.
 - 3. Finish with glass cloth and vapor barrier adhesive.
 - 4. PVC fitting covers may be used.
 - 5. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
 - 6. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- D. For insulated pipes conveying fluids above ambient temperature:
 - 1. Provide standard jackets, with or without vapor barrier, factory applied or field applied.
 - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.
 - 3. Finish with glass cloth and adhesive.
 - 4. PVC fitting covers may be used.
 - 5. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
 - 6. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- E. Inserts and Shields:
 - 1. Application: Piping 1-1/2 inches diameter or larger.
 - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 - 3. Insert Location: Between support shield and piping and under the finish jacket.
 - 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
 - 5. Insert Material: ASTM C640 cork; hydrous calcium silicate insulation, or other heavy density insulating material suitable for the planned temperature range.
- F. Finish insulation at supports, protrusions, and interruptions.

- G. For all insulated pipe exposed in finished and unfinished spaces and below 10 feet above finished floor, finish with white PVC jacket and fitting covers.
- H. For exterior applications, provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with stainless steel jacket with seams and band "buckles" located on bottom side of horizontal piping and backside of vertical piping.

3.3 TOLERANCE

- A. Substituted insulation materials shall provide thermal resistance within 10 percent at normal conditions, as materials indicated.

3.4 INSULATION SCHEDULE

- A. General: Abbreviations used in the following schedules include:

1. Field-Applied Jackets: P-PVC, K-Foil and Paper, SS-Stainless Steel, N-None.
2. Pipe Sizes: NPS - Nominal Pipe Size.

- B. Domestic Cold Water and Storm Water All Sizes (Interior): 1½" thick glass fiber insulation with self-sealing all service vapor barrier jacket.

- C. Interior Domestic Hot Water And Re-Circulated Hot Water:

PIPE SIZES (NPS)	FIELD- APPLIED JACKET	MATERIALS	THICKNESS IN INCHES	VAPOR BARRIER REQ'D
1/2 to 1-1/2	K	Glass Fiber	1	No

- D. Sanitary Drains And Traps Exposed At Fixtures For Disabled

PIPE SIZES (NPS)	FIELD- APPLIED JACKET	MATERIALS	THICKNESS IN INCHES	VAPOR BARRIER REQ'D
Up to 2"	P	Flexible Elastomeric Rubber	1	No

END OF SECTION

SECTION 23 00 34

FOOD SERVICE VENTILATION SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Provide:

1. Complete Food Service Ventilating systems including canopy hood, lights, ductwork, and control panel for exhaust fans.

1.02 RELATED SECTION

A. Specified Elsewhere:

1. Section 23 00 09 – Basic Materials and Methods
2. 23 00 36 - Mechanical Insulation.
3. 23 00 57 - Metal Ductwork.
4. Division 16 - Final Field Wiring.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. National Fire protection Association, NFPA:
 - a. 90A: Installation of Air Conditioning and Ventilating Systems.
 - b. 96: Installation of Equipment for the Removal of Smoke and Grease-Laden Vapor from Commercial Cooking Equipment.
2. National Sanitary Foundation, NSF:
 - a. Seal of approval.
3. Underwriter's Laboratories, UL:
 - a. UL listed and labeled components.

1.04 SUBMITTALS

A. Product Data:

1. Submit manufacturer's product data and installation instructions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Exhaust Hoods:

1. CaptiveAire
2. Greenheck.
3. Duo Aire.
4. Halton.

5. Kees, Inc.
6. Grease Master.

2.02 SINGLE SHELL CANOPY HOODS:

A. Construction:

1. 18 gauge stainless steel, Type 304, #3 finish, welded liquidtight.
2. Canopy internal supports consisting of angles and channels to reinforce and prevent vibration and fatigue.
3. Canopy fabricated as one piece and shipped as one piece.

B. Lights:

1. Vapor-proof U.L. Listed incandescent lights fixtures with plastic coated glass lens spaced on 3 foot centers, and wired to J-box on top of canopy; provide bulb for fixture.

PART 3 - EXECUTION

3.01 INSPECTION

- A. General: Examine areas and conditions under which exhaust hoods are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF HOODS

- A. Install hoods and extinguishing systems as indicated on Drawings and in accord with NFPA 96 and 17A.
- B. Provide all miscellaneous framing, anchors, and brackets necessary to properly support hoods.

3.03 FIELD QUALITY CONTROL

A. Start-Up:

1. Provide start-up supervision.
2. Provide instruction to AAFES Personnel on system operation.
3. Provide field certification by system manufacturer.
4. Provide performance check and tests as required by base fire department.

END OF SECTION

SECTION 23 00 36**DUCTWORK INSULATION****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Ductwork insulation.
- B. Duct liner
- C. Insulation jackets.

1.2 RELATED SECTIONS

- A. Section 23 00 01 – General Provisions – Mechanical.
- B. Section 23 00 03 – Startup, Cleaning, Testing and Adjustment.
- C. Section 23 00 09 – Basic Materials and Methods.
- D. Section 23 00 24 - Mechanical Identification.

1.3 REFERENCES

- A. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- B. ASTM C518 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- C. ASTM C553 - Mineral Fiber Blanket and Felt Insulation.
- D. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.
- E. ASTM E84 - Surface Burning Characteristics of Building Materials.
- F. ASTM E96 - Water Vapor Transmission of Materials.
- G. NFPA 255 - Surface Burning Characteristics of Building Materials.
- H. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- I. UL 723 - Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Submit under provisions of Section 230001 and Architectural Specifications.
- B. Product Data: Provide product description, list of materials and thickness for each service, and locations.
- C. Manufacturer's Installation Instructions: Indicate procedures that ensure acceptable workmanship and installation standards will be achieved.

1.5 QUALITY ASSURANCE

- A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E84.

1.6 QUALIFICATIONS

- A. Applicator: Company specializing in performing the work of this section with minimum three years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site.
- B. Deliver materials to site in original factory packaging, labeled with manufacturer's density and thickness.
- C. Store insulation in original wrapping and protect from weather, environment and construction traffic.
- D. Protect insulation against dirt, moisture, water, chemical, and mechanical damage.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 - PRODUCTS

2.1 GLASS FIBER, FLEXIBLE

- A. Manufacturers:
 - 1. Johns Manville MicroLite Type 75.
 - 2. Other acceptable manufacturers offering equivalent products.
 - a. Owens-Corning.
 - b. PPG Industries.
 - c. CSG. Corp.
- B. Insulation: ASTM C1290; flexible, noncombustible blanket.
 - 1. 'K' value: ASTM C518, 0.27 at 75 degrees F.
 - 2. Maximum service temperature: 250 degrees F.
 - 3. Maximum moisture absorption: 0.20 percent by volume.
 - 4. Density: 0.75 lb/cu ft.
- C. Vapor Barrier Jacket
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film 0.0032 inch.
 - 2. Moisture vapor transmission: ASTM E96; 0.02 perm.
 - 3. Secure with pressure sensitive tape.

- D. Vapor Barrier Tape
 - 1. Manufacturers:
 - a. Johns Manville.
 - b. Owens Corning.
 - c. PPG Industries.
 - 2. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
- E. Tie Wire: Annealed steel, 16 gage.

2.2 GLASS FIBER, RIGID

- A. Manufacturers:
 - 1. Johns Manville 800 Spin Glas.
 - 2. Other acceptable manufacturers offering equivalent products.
 - 3. Owens Corning.
 - 4. PPG Industries.
- B. Insulation: ASTM C612; rigid, noncombustible.
 - 1. 'K' value: ASTM C518, 0.23 at 75°F.
 - 2. Maximum service temperature: 450°F.
 - 3. Maximum moisture absorption: 0.20 percent by volume.
 - 4. Density: 3.0 lb/cu ft.
- C. Vapor Barrier Jacket
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film 0.0032 inch.
 - 2. Moisture vapor transmission: ASTM E96; 0.02 perm.
 - 3. Secure with pressure sensitive tape.
- D. Vapor Barrier Tape
 - 1. Manufacturers:
 - a. Johns Manville.
 - b. Owens Corning.
 - c. PPG Industries.
 - 2. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

2.3 DUCT LINER, RECTANGULAR

- A. Manufacturers:
 - 1. Johns Manville Permacote Linacoustic RC
- B. Insulation: ASTM C1071 Type 1; flexible blanket; limited combustibility – conforms to ASHRAE 62-2004
 - 1. Thickness: 1 Inch unless noted otherwise.
 - 2. Thermal "K" Value: ASTM 518, 0.25 at 75°F.
 - 3. Acoustical Value: Sound absorption coefficient: ASTM C, 423 Type "A" at 250 HZ., 0.31.

4. Maximum Service Temperature: 250°F.
 5. Water Repellency: INDA 1st 80.6.92, 6 percent mass gain.
 6. Maximum Air Velocity on Coated Air Side: 6000 Ft./Min.
- C. Liner Fasteners: Galvanized steel, self-adhesive pad with press on head.
- D. Sealants:
1. Johns Manville Super Seal HV.
 2. Johns Manville Super Seal Edge Treatment.
 3. Johns Manville Super Seal Duct Butter.
- E. Scope: As indicated on the drawings.

2.4 JACKETS

- A. Aluminum Jacket: ASTM B209
1. Thickness: 0.016 inch sheet.
 2. Finish: Smooth. Embossed.
 3. Joining: Longitudinal slip joints and 2 inch laps.
 4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
 5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that ductwork has been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Insulated ductwork conveying air below ambient temperature:
1. Provide insulation with vapor barrier jackets.
 2. Finish with tape and vapor barrier jacket.
 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- C. Insulated ductwork conveying air above ambient temperature:
1. Provide with standard vapor barrier jacket.
 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- D. Duct and Plenum Liner Application:
1. Refer to plans for scope of liner required.
 2. Adhere insulation with adhesive for 100 percent coverage.

- 3. Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing.
- 4. Seal and smooth joints.
- 5. Seal liner surface penetrations with adhesive.
- 6. Duct dimensions indicated are net inside dimensions required for air flow. Increased duct size to allow for insulation thickness.

3.3 TOLERANCE

- A. Substituted insulation materials shall provide thermal resistance within 10 percent at normal conditions, as materials indicated.

3.4 GLASS FIBER DUCTWORK INSULATION SCHEDULE

- A. Interior Concealed HVAC Supply, Return, Outside Air Ducts And Plenums

MATERIAL FIELD-APPLIED JACKET	FORM	THICKNESS IN INCHES	VAPOR BARRIER REQ'D - TYPE
Glass Fiber None	Blanket	1-1/2	Yes – Aluminum Foil

- B. Interior Exposed Rectangular HVAC Supply Return, And Outside Air Ducts And Plenums

MATERIAL FIELD-APPLIED JACKET	FORM	THICKNESS IN INCHES	VAPOR BARRIER REQ'D - TYPE
Glass Fiber None	Rigid Board	2	Yes – Aluminum Foil

- C. Interior Concealed Range Hood Exhaust Ducts

MATERIAL FIELD-APPLIED JACKET	FORM	THICKNESS IN INCHES	VAPOR BARRIER REQ'D - TYPE
Calcium Silicate None	Board	As Req'd for 2-Hr Rating	No

END OF SECTION

SECTION 23 00 39**PLUMBING PIPING****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Pipe, pipe fittings, valves, and connections for piping systems.
- B. Sanitary waste and vent.
- C. Grease Waste
- D. Domestic water.

1.2 RELATED SECTIONS

- A. Section 230001 – General Provisions – Mechanical.
- B. Section 230003 – Startup, Cleaning, Testing and Adjustment.
- C. Section 230009 – Basic Materials and Methods.
- D. Section 230024 - Mechanical Identification.
- E. Section 230027 - Vibration Isolation.
- F. Section 230030 - Piping Insulation.
- G. Section 260000 – Special Provisions for Electrical Work.

1.3 REFERENCES

- A. AGA Z21.22 - Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems.
- B. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800.
- C. ASME B16.3 - Malleable Iron Threaded Fittings.
- D. ASME B16.4 - Cast Iron Threaded Fittings Class 125 and 250.
- E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
- F. ASME B16.22 - Wrought Copper and Bronze Solder Joint Pressure Fittings.
- G. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.
- H. ASME B16.26 - Cast Bronze Fittings for Flared Copper Tubes.
- I. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.

- J. ASME B16.32 - Cast Copper Alloy Solder Joint Fittings for Solvent Drainage Systems.
- K. ASME B31.9 - Building Service Piping.
- L. ASME SEC IX - Welding and Brazing Qualifications.
- M. ASTM A47 - Ferritic Malleable Iron Castings (ASTM A47M - Ferritic Malleable Iron Castings).
- N. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- O. ASTM A74 - Cast Iron Soil Pipe and Fittings.
- P. ASTM B32 - Solder Metal.
- Q. ASTM B42 - Seamless Copper Pipe.
- R. ASTM B68 - Seamless Copper Tube (ASTM B68M - Seamless Copper Tube).
- S. ASTM B75 - Seamless Copper Tube (ASTM B75M - Seamless Copper Tube).
- T. ASTM B88 - Seamless Copper Water Tube (ASTM B88M - Seamless Copper Water Tube).
- U. ASTM B251 - Wrought Seamless Copper and Copper-Alloy Tube (ASTM B251M - Wrought Seamless Copper and Copper-Alloy Tube).
- V. ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- W. ASTM B302 - Threadless Copper Pipe (TP).
- X. ASTM B306 - Copper Drainage Tube (DWV).
- Y. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- Z. ASTM E814 - Fire Tests of Through-Penetration Fire Stops.
- AA. ASTM D1785 - Poly Vinyl Chloride Plastic Pipe, Schedules 40, 80 and 120.
- BB. ASTM F708 - Design and Installation of Rigid Pipe Hangers.
- CC. AWS A5.8 - Brazing Filler Metal.
- DD. AWWA C651 - Disinfecting Water Mains.
- EE. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.
- FF. CISPI 310 - Joints for Hubless Cast Iron Sanitary Systems.
- GG. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
- HH. MSS SP69 - Pipe Hangers and Supports - Selection and Application.

- II. MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
 - JJ. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - KK. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves.
 - LL. MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends.
 - MM. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
 - NN. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
 - OO. NCPWB - Procedure Specifications for Pipe Welding.
 - PP. UL 1479 - Fire Tests of Through-Penetration Firestops.
- 1.4 SUBMITTALS FOR REVIEW
- A. Section 230001 and Architectural Specifications.
 - B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- 1.5 SUBMITTALS AT PROJECT CLOSEOUT
- A. Project Record Documents: Tag record of actual locations of valves.
- 1.6 QUALITY ASSURANCE
- A. Perform Work in accordance with local jurisdiction. Maintain one copy on site.
 - B. Valves: Manufacturer's name and pressure rating marked on valve body.
 - C. Identify pipe with marking including size, ASTM material classification, and ASTM specification.
 - D. Welder's Certification: In accordance with ASME Section IX.
 - E. Welding Materials and Procedures: Conform to ASME Section IX.
- 1.7 REGULATORY REQUIREMENTS
- A. Perform Work in accordance with 2006 International Plumbing Code.
- 1.8 DELIVERY, STORAGE, AND PROTECTION
- A. Transport, handle, store, and protect products.
 - B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
 - C. Provide temporary protective coating on cast iron and steel valves.

- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
 - E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- 1.9 ENVIRONMENTAL REQUIREMENTS
- A. Do not install underground piping when bedding is wet or frozen.

PART 2 - PRODUCTS

2.1 SANITARY SEWER, GREASE WASTE AND VENT PIPING, BELOW GRADE

- A. Cast Iron Pipe: ASTM A74 service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.
- B. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 SANITARY SEWER, GREASE WASTE AND VENT PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.3 WATER PIPING, ABOVE GRADE

- A. Copper Tubing: ASTM B88, Type L hard drawn.
 - 1. Fittings: For 3" and 4" size, Class 150 ASME B16.24 cast flanges, ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze for all others.
 - 2. Joints: ASTM B32, solder, Grade 95TA.

2.4 FLANGES, UNIONS, AND COUPLINGS

- A. Pipe Size 3 Inches and Under:
 - 1. Ferrous pipe: Class 150 malleable iron threaded unions.
 - 2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Pipe Size Over 1 Inch:
 - 1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
 - 2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

- C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.5 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping - Drain, Waste, and Vent:

1. Conform to MSS SP58 and MSS SP69.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

B. Plumbing Piping - Water:

1. Conform to MSS SP58 and MSS SP6.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel, adjustable swivel, split ring, copper plated.
3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis, copper plated.
4. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.
5. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods. All metal in contact with copper piping shall be copper plated.
6. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook, copper plated.
7. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support, metal in contact with piping to be copper plated.
8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.6 GLOBE VALVES

A. Up To and Including 3 Inches:

1. Manufacturers:
 - a. Jenkins Model 106A.
 - b. Crane.
 - c. Nibco.
 - d. Substitutions: Not permitted.
2. MSS SP-80, Class 150, bronze body, bronze trim, handwheel, teflon disc, threaded ends.

2.7 BALL VALVES

- A. Manufacturer: Nibco T580-70-66.
- B. Other acceptable manufacturers offering equivalent products.

1. Crane.
 2. Jenkins.
 3. Substitutions: Not permitted.
- C. Construction, 2-1/2 Inches and Smaller: MSS SP-110, Class 150, 600 psi CWP, bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle threaded ends.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 230012.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 230030.
- H. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Architectural Specifications.
- I. Establish elevations of buried piping outside the building to ensure not less than 3 ft of cover.
- J. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.
- K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- L. Provide support for utility meters in accordance with requirements of utility companies.
- M. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
- N. Install bell and spigot pipe with bell end upstream.

- O. Install valves with stems upright or horizontal, not inverted.
- P. Install water piping to ASME B31.9.
- Q. Sleeve pipes passing through partitions, walls and floors.
- R. Inserts:
 - 1. Provide inserts for placement in concrete formwork.
 - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
 - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
 - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.
- S. Pipe Hangers and Supports:
 - 1. Install in accordance with ASTM B31.9, ASTM F708 and MSS SP89.
 - 2. Support horizontal piping as scheduled.
 - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 4. Place hangers within 12 inches of each horizontal elbow.
 - 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
 - 7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - 8. Provide copper plated hangers and supports for copper piping.
 - 9. Prime coat exposed steel hangers and supports. Refer to Section 099000. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
 - 10. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 230027.
 - 11. Support cast iron drainage piping at every joint.

3.3 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. For pipe sizes thru 2-1/2", install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers. For pipe sizes 3" and larger, install gate valves.
- D. Install ball or globe valves for throttling, bypass, or manual flow control services.

3.4 ERECTION TOLERANCES

- A. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain

gradients.

- B. Slope water piping minimum 0.25 percent and arrange to drain at low points.

3.5 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA

3.6 SCHEDULES

- A. Pipe Hanger Spacing:
1. Metal Piping:
 - a. Pipe size: 1/2 to 1-1/4 inches:
 - 1) Maximum hanger spacing: 5.0 ft.
 - 2) Hanger rod diameter: 3/8 inches.
 - b. Pipe size: 1-1/2 to 2 inches:
 - 1) Maximum hanger spacing: 10 ft.
 - 2) Hanger rod diameter: 3/8 inch.
 - c. Pipe size: 2-1/2 to 3 inches:
 - 1) Maximum hanger spacing: 10 ft.
 - 2) Hanger rod diameter: 1/2 inch.
 - d. Pipe size: 4 to 6 inches:
 - 1) Maximum hanger spacing: 10 ft.
 - 2) Hanger rod diameter: 5/8 inch.
 2. Plastic (PVC) Piping:
 - a. All Sizes:
 - 1) Maximum hanger spacing: 5 ft.
 - 2) Hanger rod diameter: 3/8 inch.

END OF SECTION

SECTION 23 00 42

PLUMBING SPECIALTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Floor drains.
- B. Cleanouts.
- C. Interceptors

1.2 RELATED SECTIONS

- A. Section 23 00 01 – General Provisions Mechanical.
- B. Section 23 00 03 – Startup, cleaning, Testing and Adjustment.
- C. Section 23 00 09 – Basic Materials and Methods.
- D. Section 23 00 39 - Plumbing Piping.
- E. Section 23 00 45 - Plumbing Fixtures.
- F. Section 26 00 00 – Special Provisions for Electrical Work.

1.3 REFERENCES

- A. ASME A112.21.1 - Floor Drains.
- B. ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.
- C. AWWA C506 - Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Types.
- D. PDI G-101 - Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data.

1.4 SUBMITTALS FOR REVIEW

- A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- B. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.

1.5 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

- A. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors.
- B. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.7 QUALITY ASSURANCE

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

1.8 DELIVERY, STORAGE, AND PROTECTION

- A. Transport, handle, store, and protect products.
- B. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 - GENERAL

2.1 FLOOR DRAINS

- A. Floor Drain (FD):
 - 1. Manufacturers: Josam, model number as scheduled on drawings.
 - a. J. R. Smith.
 - b. Wade.
 - c. Zurn.
 - 2. ANSI A112.21.1; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and adjustable square nikaloy strainer.

2.2 FLOOR SINKS (FS)

- A. Floor Sink (FS):
 - 1. Manufacturers: Josam, model number as scheduled on drawings.
 - a. J. R. Smith.
 - b. Wade.
 - c. Zurn.
 - 2. Lacquered cast iron body with acid resisting porcelain enamel interior and double drainage flange, weep holes, reversible clamping collar, adjustable square nikaloy strainer, sediment bucket.

2.3 CLEANOUTS

- A. Floor Cleanout (FCO):
 - 1. Manufacturers: Josam, model number as scheduled on drawings.
 - a. J. R. Smith.
 - b. Wade.
 - c. Zurn.
 - 2. Lacquered cast iron adjustable floor cleanout with internal bronze threaded plug and scoriated round satin nikaloy top for light traffic.
- B. Wall Cleanout (FCO)

1. Manufacturers: Josam, model number as scheduled on drawings.
 - a. J. R. Smith.
 - b. Wade.
 - c. Zurn.
2. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

2.18 GREASE INTERCEPTORS

- A. Manufacturer: J.R. Smith, model number as scheduled on drawings.
- B. Other acceptable manufacturers offering equivalent products.
 1. Josam.
 2. Watts.
- C. Construction:
 1. Material: Epoxy coated fabricated steel.
 2. Rough-in: Flush with floor (deep rough-in)
 3. Accessories: Multi-weir baffle assembly, integral deep seal trap, removable integral flow control.
 1. Cover: Steel, epoxy coated with gasket, securing handle, and enzyme injection port, recessed for floor finish.
- D. Unit Rating: 15 gpm flow and 30 lbs grease capacity.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Encase exterior cleanouts in concrete flush with grade.
- D. Install floor cleanouts at elevation to accommodate finished floor.
- E. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on janitor rooms, flush valves, interior and exterior hose bibs.
- F. Install air chambers on hot and cold water supply piping to each fixture in addition to specified water hammer arrestor. Fabricate same size as supply pipe or 3/4 inch minimum, and minimum 18 inches long.
- G. Install service stops on all cold and hot water rough-ins for connections to fixtures and AAFES furnished equipment.

END OF SECTION

SECTION 23 00 45

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Sinks.
- B. Service Sinks.

1.2 RELATED SECTIONS

- A. Section 23 00 01 – General Provisions – Mechanical.
- B. Section 23 00 03 – Startup, Cleaning, Testing and Adjustment.
- C. Section 23 00 09 – Basic Materials and Methods.
- D. Section 23 00 18 - Supports and Anchors.
- E. Section 23 00 39 - Plumbing Piping.
- F. Section 23 00 42 - Plumbing Specialties.
- G. Section 26 00 00 – Special Provisions for Electrical Equipment.

1.3 REFERENCES

- A. ASME A112.6.1 - Supports for Off-the-Floor Plumbing Fixtures for Public Use.
- B. ASME A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.
- C. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR REVIEW

- A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

1.5 SUBMITTALS FOR INFORMATION

- A. Manufacturer's Instructions: Indicate installation methods and procedures.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

- A. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- B. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

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

1.8 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Transport, handle, store, and protect products.
- B. Accept fixtures on site in factory packaging. Inspect for damage.
- C. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.10 WARRANTY

- A. Provide five year manufacturer warranty for electric water cooler.

PART 2 - GENERAL

2.1 HAND SINKS: See Plumbing Fixture Schedule on Drawings.

2.2 TRIPLE-COMPARTMENT SINKS: See Plumbing Fixture Schedule On Drawings

2.3 OWNER SUPPLIED KITCHEN SERVICE EQUIPMENT: See Plumbing Fixture Schedule On Drawings

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

- A. Verify existing rough-in fixture piping connections with requirements for new fixtures and trim. Modify existing rough-in as required.

3.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.
- C. Provide chrome plated service stops on all cold and hot water rough-ins for connection to AAFES furnished equipment.

- D. Install components level and plumb.
- E. Install and secure fixtures in place with wall carriers and bolts.
- F. Seal fixtures to wall and floor surfaces with sealant, color to match fixture.
- G. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

- A. Clean plumbing fixtures and equipment.

3.7 SCHEDULES

- A. Fixture Heights: Install fixtures to heights above finished floor as scheduled on drawings and shown on architectural details.

END OF SECTION

SECTION 23 00 48**PLUMBING EQUIPMENT****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Water pressure booster system.

1.02 RELATED SECTIONS

- B. Section 26 00 10 - Wiring Devices: Electrical characteristics and wiring connections.

1.03 REFERENCES

- A. ASHRAE 90A - Energy Conservation in New Building Design.
- B. ASME Section 8D - Pressure Vessels.
- C. NFPA 70 - National Electrical Code.
- D. UL 1453 - Electric Booster and Commercial Storage Tank Water Heaters.

1.04 SUBMITTALS FOR REVIEW

- A. Product Data:
 - 1. Indicate pump type, capacity, power requirements.
 - 2. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
 - 3. Provide electrical characteristics and connection requirements.

1.05 SUBMITTALS AT PROJECT CLOSEOUT

- A. Project Record Documents: Record actual locations of components and.
- B. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years experience.
- B. Provide pumps with manufacturer's name, model number, and rating/capacity identified.
- C. Ensure products and installation of specified products are in conformance with recommendations and requirements of the following organizations:
 - 1. American Gas Association (AGA).
 - 2. National Sanitation Foundation (NSF).
 - 3. American Society of Mechanical Engineers (ASME).

4. National Board of Boiler and Pressure Vessel Inspectors (NBBPVI).
 1. National Electrical Manufacturers' Association (NEMA).
 2. Underwriters Laboratories (UL).
- D. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

1.07 REGULATORY REQUIREMENTS

- C. UL and NSF certified for booster pumps
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.08 DELIVERY, STORAGE, AND PROTECTION

- A. Transport, handle, store, and protect products.
- B. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.09 WARRANTY

- A. Provide five year manufacturer warranty for water boosters.

PART 2 - PRODUCTS

2.01 PRESSURE BOOSTER SYSTEMS

- A. Manufacturer: McCann's, model as scheduled on drawings.
- B. Other acceptable manufacturers offering equivalent products.
 1. N/A
- C. Performance:
 - 3 Flow: 100 gph.
 - 4 Motors: 1/3 hp.
 - 5 Electrical Characteristics:
 - a. 120 volts, single phase, 60 Hz.

PART 3 - EXECUTION

3.01 INSTALLATION

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

END OF SECTION

SECTION 23 00 54

POWER VENTILATORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Roof exhausters.

1.2 RELATED SECTIONS

- A. Section 23 00 27 - Vibration Isolation.
- B. Section 23 00 34 – Food Service Ventilation Systems
- B. Section 23 00 57 - Ductwork.
- C. Section 26 00 10 - Wiring Devices: Electrical characteristics and wiring connections.

1.3 REFERENCES

- A. AMCA 99 - Standards Handbook.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 261 - Directory of Products Licensed to Bear the AMCA Certified Ratings Seal.
- D. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- E. AMCA 301 - Method of Publishing Sound Ratings for Air Moving Devices.
- F. NEMA MG1 - Motors and Generators.
- G. NFPA 70 - National Electrical Code.
- B. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease Vapors from Commercial cooking Equipment.
- C. UL 705 - Power Ventilators.

1.4 SUBMITTALS

- A. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- B. Manufacturer's Installation Instructions.

1.5 OPERATION AND MAINTENANCE DATA

- A. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

PART 2 - PRODUCTS

2.1 ROOF EXHAUSTERS**A. Manufacturers:**

1. CaptiveAire, model as specified on plans.
2. Other acceptable manufacturers offering equivalent products.
 - a) Greenheck.
 - b) Cook.

B. Performance as scheduled on drawings.**C. Fan Unit: Direct driven with spun aluminum housing; resiliently mounted motor.****D. Electrical Characteristics and Components**

1. Electrical Characteristics as scheduled on drawings.
2. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
2. Disconnect Switch: Factory wired, non-fusible.

E. Options: As specified on drawings**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Secure roof exhausters to structure with cadmium plated steel lag screws to roof curb.
- C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.
- D. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION

SECTION 23 00 57**DUCTWORK****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Metal ductwork.
- B. Kitchen hood ductwork.
- C. Duct cleaning.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 23 00 06 – Owner Furnished Equipment. Owner furnished kitchen range hoods.
- B. Section 230036 – Ductwork Insulation

1.3 RELATED SECTIONS

- A. Section 099000 - Painting: Weld priming, weather resistant, paint or coating.
- B. Section 23 00 01 – General Provisions – Mechanical.
- C. Section 23 00 03 – Startup, Cleaning, Testing and Adjustment.
- D. Section 23 00 09 – Basic Materials and Methods.
- E. Section 23 00 18 - Supports and Anchors: Sleeves.
- F. Section 23 00 36 - Duct Insulation.
- G. Section 23 00 63 - Air inlets and Outlets.
- H. Section 23 00 67 - Ductwork Accessories.
- I. Section 23 00 72 - Testing, Adjusting and Balancing.

1.4 REFERENCES

- A. ASTM A 36 - Structural Steel.
- B. ASTM A 90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- C. ASTM A 167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- D. ASTM A 366 - Steel, Sheet, Carbon, Cold Rolled, Commercial Quality.
- E. ASTM A 480 - General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.

- F. ASTM A 525 - General Requirements for Steel Sheet, Zinc- Coated (Galvanized) by the Hot-Dip Process.
 - G. ASTM A 527 - Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.
 - H. ASTM A 568 - Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.
 - I. ASTM A 569 - Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality.
 - J. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - K. AWS D9.1 - Welding of Sheet Metal.
 - L. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
 - M. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
 - N. NFPA 91 - Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying.
 - O. SMACNA - HVAC Air Duct Leakage Test Manual.
 - P. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
 - Q. UL 181 - Factory-Made Air Ducts and Connectors.
- 1.5 PERFORMANCE REQUIREMENTS
- A. Low pressure classification ductwork shall be fabricated, reinforced and installed as prescribed by Table 1-5 of SMACNA 1995 Edition.
 - B. No variation of duct configuration or sizes permitted except by written permission. All duct sizes shown are air stream dimensions. Increase sheet metal dimensions to compensate for duct liner thickness where lined ductwork indicated on plans.
- 1.6 SUBMITTALS
- A. Submit under provisions of Section 230001.
 - B. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, duct liner, kitchen hood exhaust, and configuration prior to start of work for all systems.
 - C. Product Data: Provide data for manufactured round duct and fittings, duct materials, duct connectors and duct liner (refer to Section 230036).
 - D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA HVAC Air Duct Leakage Test Manual.
- 1.7 PROJECT RECORD DOCUMENTS
- A. Submit under provisions of Section 230001.

- B. Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- B. Maintain one copy of document on site.

1.9 QUALIFICATIONS

- A. Manufacturer:
 - 1. Manufactured Exposed Installation Spiral Round Ductwork and Fittings: Company specializing in the products specified in this section with a minimum of ten (10) years continuous experience.
 - 2. Shop Fabricated Concealed and Exposed Installation Rectangular and Round Ductwork and Fittings: Company specializing in the products specified in this section with a minimum of five (5) years continuous experience.
- B. Installer: Company specializing in performing the work of this section with minimum five (5) years continuous documented experience.

1.10 REGULATORY REQUIREMENTS

- A. Construct ductwork to SMACNA, NFPA 90A, NFPA 90B and NFPA 96 standards.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturer.
- B. Maintain temperatures during and after installation of duct sealants.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G90 zinc coating of in conformance with ASTM A90.
- B. Rectangular galvanized steel sheet material used in the fabrication of exposed ductwork shall have a paintable finish.
- C. Manufactured Spiral Round Ductwork and Fittings:
 - 1. Manufacturer: McGill Air Flow Corp. (USA).
 - 2. Uni-Seal, single-wall round galvanized steel.
 - 3. Fittings: Uni-Seal, single-wall round spot or tack welded and sealed.
- D. Insulated Flexible Ductwork:
 - 1. Manufacturer: Flexmaster U.S.A. Type 5M.
 - 2. Other acceptable manufacturers offering similar products:

- a. Thermaflex.
 - 3. UL 181, Class I, aluminum foil laminate with polyester film liner supported by helically wound corrosive resistant spring steel wire, fiberglass insulation all with fire retardant reinforced aluminum material outer jacket.
 - 4. Pressure Rating: 6 inches WG positive and 4 inches WG negative (thru 16 inch diameter).
 - 5. Maximum Velocity: 4000 FPM.
 - 6. Operating Temperature Range: -20°F. to +250°F.
 - 7. Fasteners:
 - a. Flexmaster Series LS stainless steel clamps.
 - b. Panduit SLT Series nylon draw bands.
- E. Fasteners: Rivets, bolts, or sheet metal screws.
- F. Sealant:
 - 1. Manufacturers:
 - a. Childers
 - b. Ductmate
 - 2. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- G. Hanger Rod: ASTM A36; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as shown on drawings. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide air foil turning vanes. Where duct lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Provide manufactured "spin-in" round sheet metal taps and dampers as shown and specified on the drawings.

2.3 KITCHEN HOOD EXHAUST DUCTWORK

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible and NFPA 96.
- B. Construct of 16 gage carbon steel or 18 gage stainless steel, using continuous external welded joints.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- C. Duct sizes shown are inside air stream dimensions. For lined ducts, increase sheet metal dimensions to provide air stream dimensions shown on drawings.
- D. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal cap with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- F. Use double nuts and lock washers on threaded rod supports.
- G. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- H. Connect flexible ducts to sheet metal ductwork with stainless steel clamps or nylon draw bands and wrapped with UL 188 rated adhesive bonded tape.
- I. Provide residue traps in kitchen hood exhaust ducts at base of vertical risers with provisions for clean out. Use stainless steel for ductwork exposed to view and stainless steel or carbon steel for ducts where concealed.

3.2 CLEANING

- A. Clean work under provisions of 017423 and 230003.
- B. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

3.3 SCHEDULES

DUCTWORK AND AIR PLENUM MATERIAL SCHEDULE

AIR SYSTEM	MATERIAL
Low Pressure Supply	Galvanized Steel
Return and Relief	Galvanized Steel
Kitchen Hood Exhaust	Galvanized Steel

DUCTWORK PRESSURE CLASS SCHEDULE

AIR SYSTEM	PRESSURE CLASS
Low Pressure Supply	2 inch

Return and Relief	1 inch
Hood Exhaust	3 inch

END OF SECTION

SECTION 23 00 63**AIR OUTLETS AND INLETS****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Diffusers.
- B. Registers/grilles.

1.2 REFERENCES

- A. ADC 1062 - Certification, Rating and Test Manual.
- B. ARI 650 - Air Outlets and Inlets.
- C. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
- D. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.
- E. NFPA 70 - National Electrical Code.
- F. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

1.3 SUBMITTALS

- A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing quantity, type, size, location, application, and noise level.

1.5 PROJECT RECORD DOCUMENTS

- A. Record actual locations of air outlets and inlets.

1.6 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years experience.

PART 2 - PRODUCTS

2.1 DIFFUSERS AND GRILLES:

- A. Manufacturers:
 - 1. Metal-Aire
 - 2. Other acceptable manufacturer offering equivalent products:

- a. Titus.
 - b. Krueger.
 - c. Anemostat.
3. All new diffusers and grilles shall be of the same manufacturer and shall be of the sizes, type and finish as scheduled on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black.

END OF SECTION

SECTION 23 00 67**DUCTWORK ACCESSORIES****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Duct access doors.
- C. Flexible duct connections.
- D. Volume control dampers.

1.2 RELATED SECTIONS

- A. Section 23 00 01 – General Provisions – Mechanical.
- B. Section 23 00 03 – Startup, Cleaning, Testing and Adjustment.
- C. Section 23 00 09 – Basic Materials and Methods.
- D. Section 23 00 27 - Vibration Isolation.
- E. Section 23 00 57 - Ductwork.
- F. Section 26 00 00 – Special Provisions for Electrical Work.

1.3 REFERENCES

- A. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- B. NFPA 92B - Smoke Control Systems.
- C. NFPA 70 - National Electrical Code.
- D. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- E. UL 33 - Heat Responsive Links for Fire-Protection Service.
- F. UL 555 - Fire Dampers and Ceiling Dampers.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors and duct test holes.
- B. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes and hardware used. Include electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Provide for fire dampers and combination fire and smoke dampers.

1.5 PROJECT RECORD DOCUMENTS

- A. Record actual locations of access doors and test holes.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five (5) years experience.

1.7 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories Inc., as suitable for the purpose specified and indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site.
- B. Protect dampers from damage to operating linkages and blades.

PART 2 - PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

- A. Manufacturers:
 - 1. Titus.
 - 2. Krueger.
 - 3. Anemostat.
- B. Multi-blade device with radius blades attached to pivoting frame and bracket, steel construction, with push-pull operator strap.

2.2 FLEXIBLE DUCT CONNECTIONS

- A. Manufacturer: Ventfabrics, Inc.,
- B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- C. Connector: Fabric crimped into metal edging strip.
 - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
 - 2. Net Fabric Width: Approximately 6 inches wide.
 - 3. Metal: 3 inch wide, 24 gage thick) galvanized steel.

2.3 VOLUME CONTROL DAMPERS: (Manual Balancing Damper)

- A. Manufacturers:
 - 1. Ruskin.
 - 2. NCA Manufacturing.

- B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
 - C. Splitter Dampers:
 - 1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
 - 2. Blade: Fabricate of double thickness sheet metal to streamline shape, secured with continuous hinge or rod.
 - 3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw; Manufactured by Young Regulator.
 - D. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.
 - E. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 6 x 72 inches. Assemble galvanized steel airfoil blades in galvanized channel frame with suitable hardware; equal to Ruskin Model CD-60.
 - F. End Bearings: On multiple blade dampers, provide stainless steel bearings.
 - G. Quadrants:
 - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
 - 3. Where rod lengths exceed 30 inches provide regulator at both ends.
- 2.4 SPIN-IN COLLAR FITTINGS:
- A. For sheetmetal ductwork.
 - B. 26 ga. galvanized sheetmetal.
 - C. Flexmaster Model FLDE with damper.
 - D. Flexmaster Model FLE without damper.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 230057 for duct construction and pressure class.
- B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated. Review locations prior to fabrication.
- C. Demonstrate re-setting of fire dampers to Owner's representative.
- D. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.

- E. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- F. Use splitter dampers only where indicated.

END OF SECTION

SECTION 23 00 72**TESTING, ADJUSTING AND BALANCING****PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 RELATED SECTIONS

- A. General and Supplemental Conditions
- B. Section 23 00 01 – General Provisions – Mechanical.
- C. Section 23 00 03 – Start up, Cleaning, Testing and Adjustment.
- D. Section 23 00 09 – Basic Materials and Methods.

1.3 SCOPE

- A. Testing and balancing is limited to air side balancing of new ductwork extensions and grilles and diffusers to provide new air quantities shown on the drawings.

1.4 COOPERATION AND COORDINATION

- A. The Contractor shall make available to the TAB agency a complete copy of shop drawing submittal data on mechanical equipment including performance curves (fans and air distribution devices, etc.) necessary to complete test and balance of specified systems.
- B. The Contractor shall make available to the TAB agency a complete copy of contract drawings and specifications.
- C. Prior to the final acceptance of the HVAC systems by the Contracting Officer, the Contractor shall allow the TAB agency to schedule this work in cooperation with other trades involved and comply with the completion date of the project.
- D. The HVAC Contractor shall put the specified systems and equipment into operation and shall continue the operation of same during each working day of testing and balance.
- E. The Contractor shall schedule the following necessary personnel:
 - 1. Mechanics - To operate, adjust, replace or repair equipment that is found requiring any change/replacement in the pulleys, belts, dampers, valves, etc., of Contractors furnished and installed equipment.
 - 2. Electrician - To assist in any problems resulting from any of the power or interlock wiring installation.
 - 3. The Contractor shall make any changes in pulleys, belts and dampers or the addition of dampers as required for correct balance of the system as recommended by TAB agency, at no cost to Owner/Government.

- F. The Contractor shall make all necessary corrections within 48 hours upon notification of TAB agency of the deficiencies requiring adjustment, (piece-meal correction is not acceptable) and within 10 working days for items that require replacement or installation.
- G. The Contractor shall install exhaust hood air filters prior to the start of testing and balancing activity.
- H. Perform testing, adjusting, and balancing after leakage and pressure tests on air distribution systems have been satisfactorily completed.
- I. If the Contractor had scheduled the TAB agency to perform the work and the HVAC systems are not ready to be tested and balanced, any additional cost required to extend the TAB work shall be at the Contractor's expense.

1.5 DEFINITIONS

- A. **Adjust:** To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.
- B. **Balance:** To proportion flows within the distribution system, including submains, branches, and terminals, according to design quantities.
- C. **Draft:** A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.
- D. **Procedure:** An approach to and execution of a sequence of work operations to yield repeatable results.
- E. **Report Forms:** Test data sheets for recording test data in logical order.
- F. **System Effect:** A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- G. **System Effect Factors:** Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- H. **Terminal:** A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- I. **Test:** A procedure to determine quantitative performance of a system or equipment.
- J. **Testing, Adjusting, and Balancing Agent:** The entity responsible for performing and reporting the testing, adjusting, balancing, and commissioning procedures.
- K. **AABC:** Associated Air Balance Council.
- L. **AMCA:** Air Movement and Control Association.
- M. **ASHRAE:** American Society of Heating, Refrigerating and Air-Conditioning Engineers
- N. **NEBB:** National Environmental Balancing Bureau.

- O. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

1.6 SUBMITTALS

- A. Final Test and Balance Report: Within 30 days from completion of test and balance activities, submit 8 copies of final TAB report to Contractor.

1.7 QUALITY ASSURANCE

- A. TAB agency shall be employed by and be a sub-contractor to the prime (General) contractor.
- B. Agent Qualifications: TAB agency shall have been in continuous operation under present company name for a minimum of five (5) years performing test and balance services on projects of similar size and complexity and shall be a current member in good standing of AABC or NEBB.
- C. Certification of Testing, Adjusting, and Balancing Reports: Certify the testing, adjusting, and balancing field data reports. This certification includes the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports.
 - 2. Certify that the testing, adjusting, and balancing team complied with the approved testing, adjusting, and balancing plan and the procedures specified and referenced in this Specification.
- D. Testing, Adjusting, and Balancing Reports: Use testing, adjusting, and balancing Agent's standard forms approved by the Engineer.
- E. Instrumentation Calibration: Calibrate instruments at least every 6 months or more frequently if required by the instrument manufacturer.

1.8 PROJECT CONDITIONS

- A. Partial Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner during testing, adjusting and balancing operations to minimize conflicts with the Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine Contract Documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting and balancing of systems and equipment.
 - 1. Contract Documents are defined in the General and Supplementary Conditions of the Contract.
 - 2. Verify that balancing devices, such as test ports and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

- B. Examine approved submittal data of HVAC systems and equipment.
 - C. Submit contract documents examination report listing any deficiencies observed which may adversely affect system operation or TAB work.
 - D. On Site Examination:
 - 1. Examine system and equipment installations to verify that they are complete and that testing, cleaning and adjusting specified in individual Specification Sections have been performed.
 - 2. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports and manual volume dampers, are properly installed, and their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.
 - 3. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
 - 4. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
 - 5. Examine plenum ceilings, utilized for return air, to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.
 - 6. Examine equipment for installation and for properly operating safety interlocks and controls.
 - E. Report deficiencies discovered before and during performance of testing, adjusting and balancing procedures.
- 3.2 GENERAL TESTING AND BALANCING PROCEDURES:
- A. Perform testing and balancing procedures on each system according to the procedures contained in this section and either, AABC national standards, or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
 - B. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, valve indicators, fan-speed-control levers, and similar controls and devices, to show final settings.
- 3.3 FUNDAMENTAL AIR SYSTEMS' BALANCING PROCEDURES:
- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
 - B. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
 - C. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
 - D. Check dampers for proper position to achieve desired airflow path.
 - E. Check for airflow blockages.
- 3.4 CONSTANT-VOLUME AIR SYSTEMS' BALANCING PROCEDURES:

- A. Adjust volume dampers for main duct, submain ducts, and major branch ducts to design airflows within specified tolerances.
 - 1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
 - a. Where sufficient space in submains and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 - b. Re-measure each submain and branch duct after all have been adjusted. Continue to adjust submains and branch ducts to design airflows within specified tolerances.
- B. Measure terminal outlets and inlets without making adjustments.
 - 1. Measure terminal outlets using a direct-reading hood or the outlet manufacturer's written instructions and calculating factors.
- C. Adjust terminal outlets and inlets for each space to design airflows within specified tolerances of design values. Make adjustments using volume dampers rather than extractors and the dampers at the air terminals.
 - 1. Adjust each outlet in the same room or space to within specified tolerances of design quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 - 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.5 TOLERANCES:

- A. Set HVAC system airflow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans: Plus 5 to plus 10 percent.
 - 2. Air Outlets and Inlets: 0 to minus 10 percent.

3.6 FINAL TEST AND BALANCE REPORT:

- A. Certified Testing, Adjusting, and Balancing Reports: Submit 8 copies of reports prepared as specified in this Section, on approved forms certified by the testing, adjusting, and balancing agent.
- B. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in 3-ring binder, tabulated and divided into sections by tested and balanced systems.
- C. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
 - 1. Include a list of the instruments used for procedures, along with proof of calibration.
- D. Final Report Contents: In addition to the certified field report data, include the following:
 - 1. Test and balance field data sheets.
 - 2. Fan curves.

3. Other information relative to equipment performance, but do not include approved Shop Drawings and Product Data.
- E. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:
1. Title page.
 2. Name and address of testing, adjusting, and balancing Agent.
 3. Project name.
 4. Project location.
 5. Engineer's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of testing, adjusting, and balancing Agent who certifies the report.
 10. Summary of contents, including the following:
 - a. Design versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 11. Nomenclature sheets for each item of equipment.
 12. Notes to explain why certain final data in the body of reports vary from design values.
 13. Test conditions for fans performance forms, including the following:
 - a. Settings for exhaust-air dampers.
 - b. Conditions of filters.
 - c. Fan drive settings, including settings and percentage of maximum pitch diameter.
 - d. Other system operating conditions that affect performance.
- F. System Diagrams: Include schematic layouts of air distribution systems. Present with single-line diagrams and include the following:
1. Quantities of outside, supply, return, and exhaust airflows.
 2. Duct, outlet, and inlet sizes.
- G. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data: Include the following:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Sheave dimensions, center-to-center and amount of adjustments in inches.
 2. Motor Data: Include the following:
 - a. Make and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.

- f. Sheave dimensions, center-to-center and amount of adjustments in inches.
- g. Number of belts, make, and size.
- 3. Test Data: Include design and actual values for the following:
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.

END OF SECTION

SECTION 26 00 00**SPECIAL PROVISIONS FOR ELECTRICAL WORK****PART 1 - GENERAL****1.1 WORK INCLUDED**

- A. Furnish all labor, materials, equipment, tools and services in connection with, or properly incidental to the furnishing of equipment, installing equipment and the construction of electrical systems as described in this Division of the Specifications and/or shown on the accompanying Drawings, or reasonably implied there from, except as hereinafter specifically excluded.
- B. Furnish all additional details or special construction as required for work indicated or specified in this division or work specified in other divisions. Furnish and install all material and equipment usually furnished with systems or required to complete and make operative the installation, whether specifically mentioned or not.

1.2 REFERENCE DOCUMENTS

- A. The Electrical Drawings are a combination of scale and symbolic representation of the electrical systems required to be installed. The drawings and specifications are based on qualified skilled craftsmen procuring and installing the work. The drawings include symbolic indication of branch circuit conductors, connections to devices, hook-up of electric powered equipment, etc.
- B. Division 26 Work includes proper routing of raceways, grouping of conductors, wiring to and hook-up of devices and equipment in accordance with the total provisions of the specifications. Refer to the symbol schedule for the basis of the drawing representation. Symbols other than those in the schedule are explained elsewhere or are those commonly used in the industry. Listing of a symbol in the schedule does not imply that the symbol is used on the final contract documents. The electrical drawings indicate general locations of devices and equipment, but final locations shall be determined in reference to the Architectural, Structural, Mechanical and Electrical Drawings.
- C. The Architectural, Structural and Mechanical Drawings and Specifications including all Supplements issued thereto, are a part of these Specifications and the accompanying Electrical Drawings, and shall be complied with in every respect.

1.3 REGULATIONS, PERMITS AND APPROVALS

- A. The installation including all materials and equipment shall conform to National Electrical Code, (NFPA No. 70-2005); the National Electric Safety Code (NESC); the applicable requirements of the Base supplying energy, communications and other services to the project, and other authorities having jurisdiction pertaining to electrical installation and construction for buildings and public safety.
- B. Each of the above regulations is a minimum standard. Where the requirements of these minimum standards are less than or do not conflict with the requirements of the Contract Documents, the Contract Documents shall be followed.
- C. Obtain all permits and arrange for all inspections and approvals for the work including construction document review and site observations by the authorities having

jurisdiction. Obtain certificates of inspection and acceptance and transmit these to the Contracting Officer as a condition of acceptance. Assume and pay all fees and other costs involved in obtaining the permits, inspection, certificates and approvals as a part of Division 26 Work.

1.4 SHOP DRAWINGS AND OTHER SUBMITTAL

- A. Submit shop drawings or fully descriptive catalog data for all items of materials and equipment proposed to be furnished and/or installed. Submit sufficient copies to provide reviewed copies as need be returned plus copies for retention by the Contracting Officer.
- B. Submit on all electrical distribution equipment, wiring materials, lighting fixtures, and all components of communication, signal, protection and alarm systems. The submittal of free standing electrical equipment shall include scale drawings indicating the proposed layout of this equipment within the space allocated and the proximity of existing work, other electrical work, and work installed under other divisions of work.
- C. Submit sufficiently early to allow ample time for checking without delaying delivery of the materials to the job site. A review of any submittal, which results in a requirement to resubmit, shall not be justified basis of work delay or extra cost.
- D. The review of shop drawings or catalog data by the Contracting Officer shall not negate the Contractor's responsibility for deviations from the Drawings and Specifications unless, in writing, attention is specifically noted for such deviations at the time of submission and acceptance of the Contracting Officer is noted thereon. When attention is called to deviations from the drawings and specifications, state in letter of transmittal whether or not such deviations involve any change in contract time and cost. If this is not mentioned, it will be assumed that no change in contract time and cost is involved for making the change. Errors of any kind associated with submittal shall be the responsibility of the installer of Division 26 Work.

1.5 STANDARDS FOR ELECTRICAL MATERIALS

- A. Materials shall be new and free from defects and shall conform to the standards of the Underwriter's Laboratories, Inc., in every case where such standards have been established. Evidence of such conformance shall be the UL label or "listing" by Underwriter's Laboratories, Inc.
- B. The Specifications indicate a standard of quality for materials. Manufacturer's names and catalog numbers are used to designate materials or equipment to establish grade and quality. Where several manufacturers are named, the bid shall be based on those named manufacturer's products. Where only one manufacturer is named, unless stated otherwise, manufacturers of equal quality products will, however, be considered for substitution only after the award of the contract.

1.6 SUBSTITUTIONS

- A. In the event substitutions are to be submitted for Contracting Officer review, furnish descriptive catalog material, test data, samples, etc., of both the specified material and the proposed substitute, as well as any other pertinent data necessary to demonstrate that the proposed substitutions are acceptable equals to the specified products.
- B. Substitutions shall not be made without written acceptance and the lack of acceptance shall not be a basis of change in the work.

PART 2 - PRODUCTS

2. 2 PAINTS AND PROTECTIVE COATINGS:

A. Refer to Section 09900.

2. 2 NAMEPLATES: Nameplates shall be laminate plastic nameplates with one-fourth inch (1/4") high letters engraved thereon, which give contract identification, electric service characteristics and source of power on each of the items of equipment. Nameplates for items of equipment shall be black with white letters unless specifically noted otherwise.

A. Nameplates shall be fastened on with screws.

B. Embossed adhesive-backed plastic labels are not acceptable.

PART 3 - EXECUTION

3. 1 SERVICE, CONNECTIONS AND PERMITS:

A. Arrange for all services and pay all costs whatsoever to completely install and place in operation these electrical systems.

3. 2 COORDINATION:

A. Coordinate work with that of other trades and adjacent projects to make the proper connection at locations and at time the work is ready for the connections to be made. Review the construction of other trades and these adjacent projects to determine the physical and time requirements imposed on work in providing connections to other trades and these adjacent projects as shown on the drawings and at the schedule of completion given in the Contract Documents.

B. Harmonize work with that of the other trades so work may be installed in the most direct and workmanlike manner without hindering or handicapping the other trades. Give precedence to lines that require a stated grade for proper operation. Where space requirements conflict, the electric conduit shall, in general, yield to all other trades.

C. When any electrical equipment is operable and it is to the advantage of the project, the equipment may be operated providing that prior approval of the Contracting Officer is received and proper supervision of the equipment operation performed. The warranty period shall not commence until such time as the equipment is operated for the beneficial use of the Owner. Regardless of whether the equipment has or has not been operated, properly maintain the equipment; and at the completion of the work, properly clean, adjust, and complete all items before final acceptance is requested.

D. The Contracting Officer or others may, during the execution of the work, desire to make connections to or modifications of work installed in this Division of Work. Permission for the Contracting Officer or others to make these connections or modifications shall be granted without relieving responsibility for work installed under this Division of Work.

3. 3 RECORD DRAWINGS AND BROCHURES

A. During the execution of work, maintain on site a complete set of drawings upon which all dimensional locations of equipment, deviations and changes in the work shall be

recorded daily. These Record Drawings shall be in good condition and shall be marked "Record Drawings", signed, dated and transmitted with a transmittal letter to the Contracting Officer upon completion and acceptance of the work and before final payment is made.

- B. The following items shall be included in items furnished to the Contracting Officer for his use. (Refer to Division 01.)
1. Record Drawings as specified above and elsewhere.
 2. Brochures of lighting fixtures with copies of data of each type of luminary installed. Index each brochure indicating fixture type, manufacturer and catalog number, voltage, and lamping.
 3. Brochures of electrical distribution equipment with final drawings, operating instructions and maintenance instructions.
 4. Brochures for each communication, signal, protection and alarm systems installed with final installation and connection diagrams; and equipment operating, test and maintenance instructions.
 5. Warranties.

3.4 CARE AND CLEAN UP OF EQUIPMENT AND MATERIALS

- A. Protect each item and component of electrical equipment from moisture, concrete, mortar, paint, dust and other foreign materials from the time it arrives on the job site until installed, placed in service and accepted by the Contracting Officer, using signs, barriers and other means whereby others are made fully aware of the importance of protecting equipment from damage.
- B. Keep all electrical construction materials clean of all foreign materials from the time of arrival on the site until their installation. Time the installation of each item to avoid unnecessary exposure of the materials to destructive elements or destructive environment. Clean all installed materials of all foreign materials including concrete, mortar, spilled paint, and dust prior to final inspection. All unused electrical construction materials shall be removed from the site.
- C. After the installation is complete and before equipment is energized, thoroughly clean the interior and exterior of all equipment and materials. After the building is completed and cleaned, arrange for a power outage on each item of equipment and repeat the cleaning. This cleaning shall be performed just before final inspection. Each component shall be cleaned with air pressure, vacuumed and wiped clean of all dust and other foreign material. Components shall be cleaned of all oxidation. Any portion needing touch-up finishing and/or protective coating shall be so finished to equal the specified finish on the product.
- D. Provide for the removal of all unused, scrap, material containers and other rubbish or trash resulting from Division 26 Work from within and around all work areas on a timely basis or as directed by the Contracting Officer.

3.5 PAINTING AND PROTECTION

- A. Electrical equipment such as primary switches, switchboards, panelboard fronts, motor control centers and transformers shall be delivered to the job with suitable factory

finish. Finishes marred in transit or during installation shall be touched up under this Division of Work to present a neat, workmanlike appearance equal to the factory finish.

- B. Clean electrical work of all trash, dirt, marks, and other foreign materials under this Division of Work prior to the application of finishes.
- C. Electric work in areas of the construction to remain unpainted shall be protective finished under this Division of Work as follows unless indicated otherwise:
 - 1. Paint all exposed and non-rust inhibited hangers and supports with primer.
 - 2. Material and equipment with suitable factory-applied finishes shall be left unpainted.
- D. Painting in finished areas of the construction where finished coatings are applied under other divisions of work shall be performed under other Division of Work and shall include:
 - 1. All exposed hangers and supports and all exposed conduits and boxes with a coat of primer, and two (2) coats of semi-gloss enamel.
- E. Equipment with suitable factory-applied finishes left unpainted provided the

3.6 CUTTING AND PATCHING

- A. Do all cutting necessary for the installation of Division 26 Work. Cutting shall be carefully and neatly done so as not to damage or cut away more than necessary.
- B. Where Division 26 workmen damage or cut away work excessively, patching will be performed as a part of Division 26 Work. Patching will be by craftsman experienced in performing this type of work.

3.7 NAMEPLATES

- A. Install nameplates which give contract drawing identification and electric service characteristics on equipment unless specifically indicated otherwise including switchgear, switchboards, transformers, motor control centers, starters, disconnect switches, panelboards, telephone cabinets, terminal boards, control panels, and main control cabinets for signal and alarm systems. Also install nameplates to identify each operating device and circuit interrupter on equipment, except the typed directories shall be provided for branch panelboards.
- B. In each case where compartments, equipment, etc., are required to be "labeled" or "identified", it shall be construed that nameplates are to be installed.
- C. Locate nameplates on the exterior face of the equipment so as to be clearly visible when the equipment is in place.
- D. Fasten nameplates on with screws.
- E. Protect nameplates during painting operations.

3.8 TESTS

- A. On completion of the work, make voltage, resistance and ground tests of all wiring installed under this Contract.

- B. Such tests shall show results in accordance with the requirements of the Code. See specific items for other specific test requirements.
 - C. Any defect found shall be repaired under this Contract to the satisfaction of the Contracting Officer.
- 3.10 GUARANTEE
- A. Warrant all work done and all materials and equipment furnished to be free from defects.
 - B. Promptly repair or replace defective work, material and equipment without charge to the AAFES at a schedule suitable to the AAFES.
 - C. The warranty shall be for a period of one year after acceptance for beneficial use by AAFES unless otherwise indicated elsewhere.

END OF SECTION

SECTION 23 00 01**ELECTRICAL DEMOLITION FOR REMODELING****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Electrical demolition.

1.2 RELATED SECTIONS

- A. Section 024116 - Building Demolition.
- B. Section 024119 – Selective Structure Demolition.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on field observation and existing record documents. Report discrepancies to Contracting Officer before disturbing existing installation.
- D. Comply with applicable standards of Military Installations including Installation Design Guidance (IDG).
- E. Beginning of demolition means contractor accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Department of Public Works. Comply with Military Installation requirements for the removal, handling, and disposal of hazardous materials such as transformers, motors, and ballasts containing PCB tubes and light bulbs. □s; and fluore
- C. Provide temporary wire, cable, conduit, boxes, fire alarm devices, intrusion detection devices, emergency egress lighting, exit signs, and cash register data outlets to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system additions and revisions are complete and ready for service. Disable system only to make

switchovers and connections. Obtain permission from Contracting Officer at least 5 days before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

- E. Existing Telephone System: Maintain existing system in service until new system additions and revisions are complete and ready for service. Disable system only to make switchovers and connections. Notify Contracting Officer at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Intrusion Detection System: Maintain existing system in service until new system additions and revisions are complete and ready for service. Disable system only to make switchovers and connections. Notify the Contracting Officer and Security Police at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of Section 024116, Section 024119, and this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit. Cut conduit flush with walls and floors, and patch surfaces. Conduit above the level of new ceilings and in good condition may be reused provided it does not interfere with new work. Note the reuse of existing conduit on record documents.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned or removed. Provide blank cover for abandoned outlets that are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaries. Remove brackets, stems, hangers, and other accessories.
- I. Disconnect and remove abandoned intrusion detection equipment, fire alarm equipment, cash register data equipment, and telephone equipment not shown to remain or to be reused.
- J. Repair adjacent construction and finishes damaged during demolition and extension work. Match existing adjacent finishes and materials.
- K. Maintain access to existing electrical installations that remain active.
- L. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.
- M. Transport salvaged materials to location(s) on the installation prescribed by Department of Public Works.

3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION

SECTION 26 00 02**CONDUIT****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight flexible metal conduit.
- D. Electrical metallic tubing.
- E. Nonmetallic conduit.
- F. Flexible nonmetallic conduit.
- G. Fittings and conduit bodies.

1.2 RELATED SECTIONS

- A. Section 078400 - Firestopping.
- B. Section 26 00 03 - Surface Raceways.
- C. Section 26 00 05 - Underfloor Ducts.
- D. Section 26 00 09 - Boxes.
- E. Section 26 00 13 - Grounding and Bonding.
- F. Section 26 00 14 - Supporting Devices.
- G. Section 26 00 15 - Electrical Identification.

1.3 REFERENCES

- A. Conduit and tubing shall meet the requirements of the latest editions of following standards:
- B. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- C. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- D. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- E. ANSI/NFPA 70 - National Electrical Code - 2008.
- F. NECA "Standard of Installation."

G. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.

H. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.4 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70. Limit conductor cross sectional area to no more than 40% of conduit cross sectional area.

1.5 SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: Provide for metallic conduit, flexible metal conduit, liquidtight flexible metal conduit, metallic tubing, nonmetallic conduit, flexible nonmetallic conduit, fittings, and conduit bodies.

1.6 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 017800.

B. Accurately record actual routing of interior conduits larger than 2 inches on project record documents and of all underground conduits regardless of size.

1.7 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.9 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown schematically on Drawings unless dimensioned. Route as required to complete the wiring system.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

A. Minimum Size: 3/4 inch unless otherwise specified, 1 inch for communication.

- B. Non-Hazardous Outdoor Locations, Above Grade: Use rigid steel or intermediate metal conduit.
 - C. Wet and Damp Interior Locations Above Floor Slab: Use rigid steel conduit, intermediate metal conduit or electrical metallic tubing.
 - D. Dry Interior Locations Above Floor Slab (Including Hollow Stud Partitions):
 - 1. Concealed: Use rigid steel, intermediate metal conduit or electrical metallic tubing.
 - 2. Exposed: Use rigid steel, intermediate metal conduit or electrical metallic tubing.
- 2.2 METAL CONDUIT
- A. Rigid Steel Conduit: ANSI C80.1.
 - B. Intermediate Metal Conduit (IMC): Rigid steel.
 - C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit; aluminum fittings may be used with steel conduit.
- 2.3 PVC COATED METAL CONDUIT
- A. Description: NEMA RN 1; rigid steel conduit with external PVC coating, 40 mil thick.
 - B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel fittings with external PVC coating to match conduit.
- 2.4 FLEXIBLE METAL CONDUIT
- A. Description: Interlocked steel construction.
 - B. Fittings: ANSI/NEMA FB 1.
 - C. Flexible conduit is not allowed for communication system.
- 2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT
- A. Description: Interlocked steel construction with PVC jacket.
 - B. Fittings: ANSI/NEMA FB 1.
 - C. Flexible conduit is not allowed for communication system.
- 2.6 ELECTRICAL METALLIC TUBING (EMT)
- A. Description: ANSI C80.3; galvanized tubing.
 - B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel compression type. Set screw or indent type fittings are not acceptable.
- 2.7 NONMETALLIC CONDUIT
- A. Description: NEMA TC 2; Schedule 40 PVC.

- B. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation."
- B. Install nonmetallic conduit in accordance with manufacturer's instructions.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers. Where possible, support conduits in ceiling cavity space at the level of structural roof joists.
- E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- F. Fasten conduit supports to building structure and surfaces under provisions of Section 260014. **DO NOT SUPPORT CONDUITS DIRECTLY FROM ROOF DECK.**
- G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- H. Do not attach conduit to ceiling support wires.
- I. Arrange conduit to maintain headroom and present neat appearance.
- J. Route exposed conduit parallel and perpendicular to walls.
- K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- L. Route conduit in and under slab directly from point-to-point where possible. Avoid conduit crossovers where possible.
- M. Maintain adequate clearance between conduit and piping.
- N. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- O. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- P. Bring conduit to shoulder of fittings; fasten securely.
- Q. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum. Use only an approved hotbox bender to make bends in nonmetallic conduit.
- R. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- S. Install no more than equivalent of three 90-degree bends between boxes (no more than two 90-degree bends for conduits containing telephone cables, fire alarm cables,

intrusions system cables, local area network (LAN) cables, etc.). Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate factory elbows for bends in metal conduit larger than 2 inch size.

- T. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
 - U. Provide expansion/deflection couplings to accommodate expansion and deflection where conduit crosses seismic joints or expansion joints. Such couplings shall have braided copper bonding jumpers.
 - V. Provide suitable pull string in each empty conduit except sleeves less than 20 feet long and nipples.
 - W. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
 - X. Ground and bond conduit under provisions of Section 260013.
 - Y. Identify conduit under provisions of Section 260015.
 - Z. Where conduits for telephone cables, cash register cables, etc. are stubbed from wall boxes or cabinets to above accessible ceilings, turn conduits out of wall approximately 12 inches below roof joist in an accessible location. Coordinate location with other trades. Provide bushing or coupling on end of conduit to prevent signal cable contact with sharp metal. Provide tag on end of conduit indicating type and location of utilization outlet (example: TELEPHONE - BREAK ROOM).
 - AA. In interior locations, turn nonmetallic conduits out of floor slab using rigid steel elbows. Continue raceway above floor slab using metallic conduit.
 - BB. Where conduits enter boxes and cabinets, provide bushings with plastic insulated throat for conduits 1 inch and larger.
 - CC. Seismic Bracing: for projects located in Seismic Zone 2,3, or 4; provide seismic bracing for suspended conduits and trapeze hangers at interval of 20 feet or less. Bracing shall consist of 1-5/8" square channel both parallel and perpendicular to conduit, and fastened to roof joist at 45 degree angle relative to vertical.
 - DD. In communications runs:
 - 1. Provide pull box if run is longer than 100 feet.
 - 2. Provide long sweep elbow to turn conduit route. Pull box is not acceptable.
 - 3. Provide pull box if run has more than 180 Deg. bend.
3. 2 INTERFACE WITH OTHER PRODUCTS
- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Section 078400.
 - B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION

SECTION 26 00 09**BOXES****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Floor boxes.
- C. Pull and junction boxes.

1.2 RELATED SECTIONS

- A. Section 078400 - Firestopping.
- B. Section 083100 - Access Doors.
- C. Section 26 00 10 - Wiring Devices: Wall plates in finished areas and floor box service fittings.
- D. Section 26 00 12 - Cabinets and Enclosures.

1.3 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- F. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR CLOSEOUT

- A. Section 017800 - Project Closeout.
- B. Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1 galvanized steel.
- B. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include male fixture studs where required.
- C. Concrete Ceiling Boxes: Concrete type.
- D. Cast Boxes: NEMA FB 1, Type FD, cast ferrous alloy. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- E. Wall Plates for Finished Areas: As specified in Section 260010.
- F. Weatherproof exterior boxes to house receptacles: Provide flush box with cover to allow weatherproof integrity to be maintained with a UL listed plugcap inserted into receptacle. See NEC Section 410-57(b).

2.2 FLOOR BOXES

- A. Floor Boxes: NEMA OS 1, fully adjustable 1-1/2 inches deep.
- B. Material: Cast metal.
- C. Shape: Rectangular.
- D. Service Fittings: As specified in Section 260010.

2.3 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Hinged Enclosures: As specified in Section 260012.
- C. Surface Mounted Cast Metal Box: NEMA 250, Type 6; flat-flanged, surface mounted junction box:
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
- D. In-Ground Cast Metal Box: NEMA 250, Type 6, inside flanged, recessed cover box for flush mounting:
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
 - 3. Cover Legend: "ELECTRIC" or TELEPHONE as appropriate.
- E. Precast Concrete Handholes:
 - 1. Four inch reinforced concrete walls.
 - 2. Precast 6 inch x 6 inch cable entrance at bottom center on each side.
 - 3. Cast iron frame.
 - 4. Cast iron tread type lid with cast letters reading ELECTRIC or TELEPHONE as appropriate.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify locations of floor boxes and outlets in prior to rough-in. Where available, use dimensional data to locate boxes.

3.2 INSTALLATION

- A. Install boxes in accordance with NECA "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
- E. Orient boxes to accommodate wiring devices as specified in Section 260010.
- F. Maintain headroom and present neat mechanical appearance.
- G. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- H. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- I. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- J. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- K. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- L. Unless otherwise indicated on plans, align adjacent wall mounted outlet boxes for switches, manual starters, interval timers, thermostats, and similar devices. Align wall mounted boxes for receptacles, telephone jacks, local area network outlets, cash register outlets, television antenna outlets, and the like. Where such devices are shown in close proximity on plans, locate adjacent outlets with no more than 4 inch space between adjacent boxes.
- M. Use flush mounting outlet boxes in all areas except mechanical rooms and electrical closets.
- N. Unless otherwise indicated on plans, locate flush mounting boxes in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- O. Do not install flush mounting boxes back-to-back in walls; provide minimum 6 inches separation.

- P. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness. After finished wall material is applied, provide box extensions for all boxes with setback more than 1/8 inch.
- Q. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- R. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- S. Use adjustable steel channel fasteners for hung ceiling outlet box.
- T. **DO NOT FASTEN BOXES TO CEILING SUPPORT WIRES NOR DIRECTLY TO ROOF DECK.**
- U. Support boxes independently of conduit.
- V. Use gang box where more than one device is mounted together. Do not use sectional box. Provide metal barrier plates between gangs to separate line voltage from low voltage systems and where voltage between adjacent light switches exceeds 300 volts.
- W. Use gang box with plaster ring for single device outlets.
- X. Use cast outlet box in exterior locations exposed to the weather, interiors of walk-in refrigeration equipment, and wet locations. Provide vapor seals at conduit entrances to these boxes. Use U.L. listed sealing compound.
- Y. Use cast floor boxes for installations in slab on grade.
- Z. Set floor boxes level. Recheck level and elevation immediately after concrete pour and rough finish. Where floor boxes for power, telephone, cash register data, and intrusion detection system occur together, insure these boxes are spaced so as to be completely covered by store fixtures.
- AA. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.
- BB. Where fossil fuel driven vehicles, appliances, or equipment are present, locate all boxes at least 36 inches above floor level. Feed such boxes with cable and conduit from above. Allow no electrical work to penetrate the space from floor level to 18 inches above floor.

3.3 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate installation of outlet box for equipment connected to allow accessibility of box and proper operation of equipment.

3.4 ADJUSTING

- A. Adjust floor box flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

3.5 CLEANING

- A. Section 017423 - Cleaning: Cleaning installed work.
- B. Clean interior of boxes to remove dust, debris, and other material.
- C. Clean exposed surfaces and restore finish.
- D. Check boxes for the presence of drywall screws, concrete residue, and sharp other objects. Remove all sharp objects.

END OF SECTION

SECTION 26 00 10**WIRING DEVICES****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Device plates and decorative box covers.
- D. Floor box service fittings.

1.2 RELATED SECTIONS

- A. Section 26 00 03 - Surface Raceways
- B. Section 26 00 09 - Boxes.
- C. Section 26 00 32 - Telephone Service, Raceways and Wiring.

1.3 REFERENCES

- A. NECA - Standard of Installation.
- B. NEMA WD 1 - General Requirements for Wiring Devices.
- C. NEMA WD 6 - Wiring Device -- Dimensional Requirements.
- D. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR REVIEW

- A. Section 013300 - Submittals: Procedures for submittals.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 013300 - Submittals: Submittals for information.
- B. Submit manufacturer's installation instructions.

1.6 QUALIFICATIONS

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

1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.

- B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

- A. Manufacturers:
1. P & S.
 2. Hubbell.
 3. G.E.
- B. Description: NEMA WD 1, Heavy-Duty, AC only general-use snap switch. Provide single pole, double pole, three-way, four way, pilot light, or momentary contact type as indicated.
- C. Body and Handle: Ivory plastic with toggle handle.
- D. Indicator Light: Separate pilot strap; red lens.
- E. Ratings:
1. Voltage: 120-277 volts, AC.
 2. Current: 20 amperes.
- F. For control of mechanically held contactors or relays; provide three position, momentary contact switches with spring return to center off position. Momentary contact switches shall be rated 120/277 volt, 20 amperes.

2.2 RECEPTACLES

- A. Manufacturers:
1. P & S.
 2. Hubbell.
 3. G.E.
- B. Description: NEMA WD 1, heavy duty, specification grade receptacle. In barber shop waiting area, provide safety type receptacles which shall discourage insertion of foreign object into receptacle by small children.
- C. Device Body: Ivory nylon.
- D. Configuration: NEMA WD 6, type as specified and indicated.
- E. Convenience Receptacle: Type 5-20.
- F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.
- G. Isolated Ground Receptacle: Type 5-20. Provide with orange body and plate.
- H. Telephone Jack: See Section 260032 for requirements.

2.3 WALL PLATES

- A. Decorative Cover Plate: Ivory, smooth nylon.
- B. Weatherproof Receptacle Cover: Gasketed metal with hinged gasketed device cover. Provide recessed assembly. Construction shall be such that the weatherproof integrity of the assembly shall not be compromised by the insertion of a plugcap and cord.

2.4 FLOOR MOUNTED SERVICE FITTINGS

- A. Manufacturers:
 - 1. Walker.
 - 2. Hubbell.
- B. Flush Cover Convenience Receptacle:
 - 1. Material: Brass.
 - 2. Configuration: Duplex flap opening.
- C. Flush Cover Communication Outlet:
 - 1. Material: Brass.
 - 2. Configuration: 2-1/8 x 1 inch combination threaded opening.
- D. Flush Cover Combination Fitting:
 - 1. Material: Brass.
 - 2. Configuration: Duplex flap opening with 2-1/8 x 1 inch combination threaded opening.
- E. Protective Ring: Brass finish.
- F. Split Nozzle: Brass finish.
- G. Carpet Ring: Brass.

PART 3 - PRODUCTS**3.1 EXAMINATION**

- A. Verify that outlet boxes are installed at proper height.
- B. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify that floor boxes are adjusted properly.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install in accordance with NECA "Standard of Installation."
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install receptacles with grounding pole on top.
- E. After connecting wires to GFCI receptacles, wrap terminals with four layers of electrician's tape.
- F. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.
- G. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- H. Connect wiring devices by wrapping conductor around screw terminal.
- I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- J. Install protective rings on active flush cover service fittings.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 260009 to obtain mounting heights indicated on drawings.
- B. Coordinate the installation of wiring devices with underfloor duct service fittings provided under Section 260005.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.
- F. Verify that each telephone jack is properly connected and circuit is operational.

3.6 CLEANING

- A. Section 017400 - Cleaning: Cleaning installed work.
- B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 26 00 13**GROUNDING AND BONDING****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Grounding conductors.
- B. Equipment grounding conductors.
- C. Bonding.

1.2 REFERENCES

- A. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (International Electrical Testing Association).
- B. NFPA 70 - National Electrical Code - 2008.

1.3 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 5 ohms.

1.4 SUBMITTALS FOR REVIEW

- A. Section 013000 - Submittals: Procedures for submittals.
- B. Product Data: Provide for grounding electrodes and connections.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 013000 - Submittals: Submittals for information.
- B. Test Reports: Indicate overall resistance to ground.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.6 SUBMITTALS FOR CLOSEOUT

- A. Section 017000 - Project Closeout: Procedures for submittals.
- B. Section 017800 - Project Record Documents: Record actual locations of components and grounding electrodes.

1.7 QUALIFICATIONS

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

1.8 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.1 WIRE

- A. Material: Stranded copper. Unless noted otherwise, provide with green insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.13.

END OF SECTION

SECTION 26 00 14**SUPPORTING DEVICES****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

1.2 REFERENCES

- A. NECA - National Electrical Contractors Association.
- B. ANSI/NFPA 70 - National Electrical Code.

1.3 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Product Data: Provide manufacturer's catalog data for fastening systems.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS

- A. Materials and Finishes: Provide adequate corrosion resistance.
- B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.
- C. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Use precast insert system or expansion anchors and preset inserts.
 - 2. Steel Structural Elements: Use beam clamps or welded fasteners.
 - 3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
 - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.
 - 5. Solid Masonry Walls: Use expansion anchors and preset inserts.
 - 6. Sheet Metal: Use sheet metal screws.

7. Wood Elements: Use wood screws.

2.2 STEEL CHANNEL

A. Manufacturer: Unistrut (P1000 unless otherwise noted) or approved equal.

B. Description: Galvanized or Painted steel.

PART 3 - EXECUTION

3.1 INSTALLATION

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

B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

D. Do not use spring steel clips and clamps.

E. Do not use powder-actuated anchors.

F. Do not drill or cut structural members.

G. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

H. Install surface-mounted cabinets and panelboards with minimum of four anchors.

I. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.

J. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 26 00 15**ELECTRICAL IDENTIFICATION****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Wire and cable markers.
- C. Conduit markers.

1.2 RELATED SECTIONS

- A. Section 099000 - Painting.

1.3 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Product Data: Provide catalog data for nameplates, labels, and markers.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.6 SAMPLES

- A. Furnish under provisions of Section 013000.
- B. Provide two of each size and type nameplate and warning tape.

PART 2 - PRODUCTS

2.1 NAMEPLATES

- A. Nameplates: Engraved three-layer laminated plastic, white letters on black background. Screw on type with two self tapping screws. Mastic type nameplates not allowed.
- B. Locations:

1. Each switch in switchboard.
2. Each lighting and appliance panelboard.
3. Each breaker in distribution panel.
4. Each safety switch not in sight of utilization equipment.
5. Each automatic motor starter.
6. Relays and contactors. Indicate loads controlled.
7. Time switches. Indicate load controlled.
8. Fire alarm annunciators.
9. Where noted on plans.

C. Letter Size:

1. Use 1/8 inch letters for identifying individual equipment and loads such as safety switches, motor starters, and relays.
2. Use 1/4 inch letters for identifying grouped equipment and loads such as panelboards, switchboards, motor control centers.

2.2 WIRE MARKERS

- A. Description: Cloth, tape, split sleeve, or tubing type wire markers.
- B. Locations: Each conductor at distribution equipment panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.
- C. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder circuit number.
 2. Control Circuits: Control wire number corresponding to applicable control schematics.

2.3 CONDUIT MARKERS

- A. Location: Furnish markers for each conduit longer than 6 feet.
- B. Spacing: 20 feet on center.
- C. Color:
1. 480 Volt System: Sand.
 2. 208 Volt System: Gray.
 3. Fire Alarm System: Red.
 4. Security System: Black.
- D. Legend:
1. 480 Volt System: 277/480v.
 2. 208 Volt System: 120/208v.
 3. Fire Alarm System: Fire Alarm.
 4. Security System: Security.

2.4 UNDERGROUND WARNING TAPE

- A. Description: 4 inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines. Detection shall be by means of continuous integral metal conductor factory installed in warning tape.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates.

3.2 APPLICATION

- A. Install nameplate parallel to equipment lines.
- B. Secure nameplate to equipment front using screws.
- C. Identify conduit using field painting under provisions of Section 099000.
- D. Paint colored band on each conduit longer than 6 feet.
- E. Paint bands 20 feet on center.
- F. Color:
 - 1. 480 Volt System: Sand.
 - 2. 208 Volt System: Gray.
 - 3. Fire Alarm System: Red.
 - 4. Security System: Black.
- G. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.

END OF SECTION

SECTION 26 00 20**DRY TYPE TRANSFORMERS****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Two-winding transformers.

1.2 RELATED SECTIONS

- A. Section 26 00 02 - Conduit: Flexible conduit connections.
- B. Section 26 00 13 - Grounding and Bonding.

1.3 REFERENCES

- A. NEMA ST 1 - Specialty Transformers (Except General-Purpose Type).
- B. NEMA ST 20 - Dry-Type Transformers for General Applications.
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (International Electrical Testing Association).
- D. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR REVIEW

- A. Section 013300 - Submittals: Procedures for submittals.
- B. Product Data: Provide outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 013300 - Submittals: Submittals for information.
- B. Test Reports: Indicate loss data, efficiency at 25, 50, 75 and 100 percent rated load, and sound level.
- C. Submit manufacturer's installation instructions. Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.6 SUBMITTALS FOR CLOSEOUT

- A. Section 017800 - Project Closeout: Submittals for project closeout.
- B. Record actual locations of transformers in project record documents.

1.7 QUALIFICATIONS

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

1.8 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 - PRODUCTS

2.1 TWO-WINDING TRANSFORMERS

- A. Manufacturers:
 - 1. Square D.
 - 2. General Electric.
 - 3. Cutler Hammer.
- B. Description: NEMA ST 20, factory-assembled, air cooled dry type transformers, ratings as indicated.
- C. Primary Voltage: 480 volts, 3 phase.
- D. Secondary Voltage: 208Y/120 volts, 3 phase.
- E. Insulation system and average winding temperature rise for rated kVA as follows:
 - 1. 1-15 kVA: Class 185 with 115 degrees C rise.
 - 2. 16-500 kVA: Class 220 with 115 degrees C rise.
- F. Case temperature: Do not exceed 35 degrees C rise above ambient at warmest point at full load.
- G. Winding Taps:
 - 1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
 - 2. Transformers 15 kVA and Larger: NEMA ST 20.
- H. Sound Levels: NEMA ST 20.
- I. Basic Impulse Level: 10 kV for transformers less than 300 kVA, 30 kV for transformers 300 kVA and larger.

- J. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- K. Mounting:
 - 1. 1-15 kVA: Suitable for wall mounting.
 - 2. 16-75 kVA: Suitable for wall or trapeze mounting.
 - 3. Larger than 75 kVA: Suitable for floor or trapeze mounting.
- L. Coil Conductors: Continuous windings with terminations brazed or welded.
- M. Enclosure: NEMA ST 20, Type 1 ventilated. Provide lifting eyes or brackets.
- N. Isolate core and coil from enclosure using vibration-absorbing mounts.
- O. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

2.2 SOURCE QUALITY CONTROL

- A. Production test each unit according to NEMA ST20.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set transformer plumb and level.
- B. Use flexible conduit, under the provisions of Section 16111, 2 feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.
- C. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by the manufacturer.
- D. Mount floor-mounted transformers on vibration isolating pads suitable for isolating the transformer noise from the building structure.
- E. Mount trapeze-mounted transformers as indicated.
- F. Provide seismic restraints. Provide lateral and longitudinal bracing using 1-5/8" square steel channel.
- G. Provide grounding and bonding in accordance with Section 16170.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.2.

3.3 ADJUSTING

- A. Measure primary and secondary voltages and make appropriate tap adjustments.

3.4 CLEANING

- A. Section 017400 - Cleaning: Cleaning installed work.
- B. Touch up scratched or marred surfaces to match original finishes.
- C. Clean dust and debris from interior and exterior of transformer according to manufacturer's instructions.

END OF SECTION

SECTION 26 00 22**PANELBOARDS****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Distribution panelboards.
- B. Branch circuit panelboards.

1.2 RELATED SECTIONS

- A. Section 26 00 13 - Grounding and Bonding.
- B. Section 26 00 15 - Electrical Identification.
- C. Section 26 00 24 - Fuses.

1.3 REFERENCES

- A. NECA Standard of Installation (published by the National Electrical Contractors Association).
- B. NEMA AB1 - Molded Case Circuit Breakers.
- C. NEMA ICS 2 - Industrial Control Devices, Controllers and Assemblies.
- D. NEMA KS1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
- E. NEMA PB 1 - Panelboards.
- F. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
- G. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (published by the International Electrical Testing Association).
- H. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR REVIEW

- A. Section 013300 - Submittals: Procedures for submittals.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- C. Arrange circuit breakers in panels same as shown on plans.

1.5 SUBMITTALS FOR INFORMATION

- A. Section 013300 - Submittals: Submittals for information.

- B. Submit manufacturer's installation instructions. Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.6 SUBMITTALS FOR CLOSEOUT

- A. Section 017800 - Project Closeout: Submittals for project closeout.
- B. Record actual locations of panelboards and record actual circuiting arrangements in project record documents.
- C. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.7 QUALIFICATIONS

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

1.8 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.9 MAINTENANCE MATERIALS

- A. Section 017800 - Project Closeout.
- B. Furnish spare key for each panelboard installed. Example (20) spare keys for (20) panels.

PART 2 - PRODUCTS

2.1 DISTRIBUTION PANELBOARDS

- A. Manufacturers:
 - 1. Square D.
 - 2. General Electric.
 - 3. Cutler Hammer.
- B. Description: NEMA PB 1, circuit breaker type or fusible switches type.
- C. Service Conditions:
 - 1. Temperature: 104 degrees F.
 - 2. Altitude: 3000 feet.
- D. Panelboard Bus: Copper ratings as indicated. Provide copper ground bus in each panelboard.

- E. Minimum integrated short circuit rating: As shown on drawings.
- F. Molded Case Circuit Breakers: NEMA AB 1, bolt on circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for heating, air conditioning, and refrigeration equipment branch circuits. Provide circuit breakers UL listed SWD for ON-OFF control of lighting or other loads.
- G. Enclosure: NEMA PB1, Type 1 for dry locations, Type 3R for exterior locations.
- H. Cabinet Front: Surface type, fastened with hinge and latch, hinged door with flush lock, metal directory frame, finished in manufacturer's standard gray enamel.

2.2 LIGHTING AND APPLIANCE PANELBOARDS

- A. Manufacturers:
 - 1. Square D.
 - 2. General Electric
 - 3. Cutler Hammer.
- B. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.
- C. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard; provide insulated ground bus where scheduled.
- D. Minimum Integrated Short Circuit Rating: As shown on drawings.
- E. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for heating, air conditioning, or refrigeration equipment circuits, Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.
- F. Enclosure: NEMA PB 1, Type 1 for dry locations, type 3R for exterior locations.
- G. Cabinet Box: 6 inches deep, 20 inches wide.
- H. Cabinet Front: With concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1 and the NECA "Standard of Installation."
- B. Install panelboards plumb. Install recessed panelboards flush with wall finishes.
- C. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor and with handle of top circuit breaker no more than 6'-6" above floor.

- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide screw-on type engraved plastic nameplates under the provisions of Section 260015.
- G. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Stub and cap spare conduits out of wall minimum 6" below roof joist in areas with exposed roof structure. Minimum spare conduits: 3 empty 1 inch. Identify each as SPARE.
- H. Ground and bond panelboard enclosure according to Section 260013.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.4 for switches, Section 7.5 for circuit breakers.

3.3 CLEANING

- A. Section 017400 - Cleaning: Cleaning installed work.
- B. Touch up scratched or marred surfaces to match original finish.
- C. Clean dust and debris from interior and exterior of panelboards.

END OF SECTION

SECTION 26 00 32**TELEPHONE SERVICE, RACEWAYS AND WIRING****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. New telephone cables and outlets.

1.2 RELATED SECTIONS

- A. Section 01 78 00 - Project Closeout.
- B. Section 01 78 00 - Project Record Documents.
- C. Section 26 00 02 - Conduit.
- D. Section 26 00 09 - Boxes.

1.3 REFERENCES

- A. EIA/TIA 568 - Commercial Building Wiring Standard.
- B. EIA/TIA 569 - Commercial Building Standard for Telecommunications Pathways and Spaces.
- C. NFPA 70 - National Electrical Code.

1.4 SYSTEM DESCRIPTION

- A. Extension/rework of existing telephone system cabling as required by remodel project.
- B. Premises Wiring: Complete from telephone backplate to each jack using wire and cable as specified.
- C. Accessories: Connector blocks.

1.5 SUBMITTALS

- A. Section 013300 - Submittals: Procedure for submittals.
- B. Product data: for cables, jacks, and accessories.
- C. Test: Manufacturer's certified on-reel test results.
- D. Samples: Provide 12" sample of each cable type. Choose samples to show all information printed on jacket.

1.6 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 017800.
- B. Record actual locations and sizes of raceways and outlets.

1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with commercial telephone utilities rules and regulations.

1.8 QUALIFICATIONS

- A. Installer: Workers specializing in installing telephone premises wiring with minimum three years documented experience.

1.9 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish Products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

1.10 EXTRA MATERIALS

- A. Furnish under provisions of Section 017800.

PART 2 - PRODUCTS

2.1 TELEPHONE AND LAN CABLES

- A. Building cable shall be 10 Base-T twisted pair cable, 23 AWG copper with 4 unshielded twisted pairs, Category 6A. Belden 7852A or equal, plenum rated and color coded.

2.2 JACKS

- A. Duplex 8 position type RJ45S modular jacks with matching faceplate. Provide one 4 pair building cable from each jack to telephone equipment wiring connectors at telephone terminal board. Jacks shall be AMP or equal, color coded.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wire and cable in accordance with manufacturer's instructions and in accordance with EIA/TIA 568.
- B. Support raceways under the provisions of Section 260014.
- C. The contractor shall perform the following cable tests on all cables:
 - 1. Conductor OHM's resistance.
 - 2. Cable shield continuity.
 - 3. Conductor continuity including testing all pairs for; opens, shorts, grounds, crosses, splits, reversed and transposed pairs.
 - 4. Insulation resistance test between all groups including grounds and/or shields, and a minimum of 20% of the total conductors in each group.
 - 5. All voice circuits shall be tested for opens, shorts, grounds, and crossed pairs.
 - 6. All data circuits shall be bit error rate tested. Passing criteria for bit error rate tests shall be no more than one times ten to the negative six (1×10^{-6}) errors over a 15 minute period.

END OF SECTION

SECTION 26 00 38**ELECTRIC CONTROLS****PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Time switches.

1.2 RELATED SECTIONS

- A. Section 26 00 12 – Cabinets and Enclosures: Cabinets and terminal blocks.
- B. Section 26 00 27 - Enclosed Contactors.

1.3 REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control Systems.
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- D. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Provide for each component showing electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.5 QUALIFICATIONS

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

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish Products listed and classified by Underwriters Laboratories, Inc.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

- A. Time switches shall be seven day plus 365 day solid state electronic type, capable of independent programming of the indicated number of independent channels, with programmable automatic daylight savings time adjustment, and shall be housed in a lockable, non-metallic case. Surface or flush mounting as indicated on plans.

- B. Switches shall be capable of fully independent 7 day scheduling, with up to 3 ON and 3 Off times per channel per day, plus a special 365 holiday schedule, assigned by month and day.
- C. They shall be capable of independent duty cycling during the scheduled ON time, with up to 3 patterns per channel per day and built-in 5 minute short cycle protection.
- D. They shall have independent timed override for each channel for manual control and be programmable independently per channel per day, from 1 minute to 23 hours and 59 minutes.
- E. Switches shall have brown-out protection and automatic 4 second load staggering when channels are programmed to be ON at the same time or after power outages and shall be equipped with a rechargeable carry-over system for up to 14 hours of carry-over. Switches shall perform a self-test every 60 seconds to assure a fail-safe operation.
- F. Time switches shall be powered by a 120VAC, 60HZ source. Contact configuration to be N.O. (N.C.) for each channel, with a rating of 15 amperes ballast, 120/240/277VAC. Contact closure shall be maintained for direct control of lighting and exhaust fan loads.
- G. Manufacturers for time switches: Paragon EC series or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment according to manufacturer's written instructions.
- B. Train and lace wiring in cabinets.
- C. Program time switches according to instructions from Contracting Officer.
- D. Label each time switch with engraved nameplate.
- E. Label each item switch load contact indicating contactors controlled by each load contact.
- F. Provide two hours training of AAFES personnel in programming operations.

END OF SECTION